IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WISCONSIN

CTP INNOVATIONS, LLC,	)	
	)	
Plaintiff,	)	
	)	**Civil Action No. 15-cv-266**
v.	)	
	)	**JURY TRIAL DEMANDED**
SCHUMANN PRINTERS, INC.,	)	
	)	
Defendant.	)	
	)	

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff CTP Innovations, LLC, for its Complaint against Defendant Schumann Printers, Inc., states as follows:

I. PRELIMINARY STATEMENT

This lawsuit is one of over forty lawsuits that Plaintiff CTP Innovations, LLC ("CTP") has filed in district courts throughout the United States over the past eighteen months. In each of those case, CTP asserted infringement of U.S. Patent Nos. 6,611,349 (the "'349 Patent") and/or 6,738,155 (the "'155 Patent"). The vast majority of those cases have been resolved and dismissed. The Judicial Panel on Multidistrict Litigation consolidated the remaining cases before the District of Maryland in *In re: CTP Innovations, LLC Patent Litigation*, Case No. MDL 14-MD-2581. This Complaint, therefore, is a "tag-along filing" that will be consolidated under MDL 14-MD-2581.

On February 27, 2015, the District of Maryland provided all of the defendants in the consolidated case the opportunity to stay litigation against them if they each agreed to sign the "Stipulation for Defendant(s) to be Bound by the Estoppel Effect of 35 U.S.C. § 315(e). As of the filing of this Complaint, all of the defendants have filed the stipulation.

The District of Maryland granted the option to stay because a group of third-party manufacturers filed four petitions for *inter partes* review of the '155 Patent and the '349 Patent with the Patent Trial and Appeal Board of the United States Patent and Trademark Office ("PTAB"). Based on the petitions, PTAB instituted *inter partes* reviews of all of the claims of the '155 Patent and claims 1-3 and 10-13 of the '349 Patent. PTAB declined to institute *inter partes* review of claims 4-9 of the '349 Patent. On March 31, 2015, the PTAB denied Petitioners' Request for Rehearing and reconfirmed claims 4-9 are not part of the instituted review.

Plaintiff asserts infringement against Defendant in this case of claim 4 and potentially claims 5 through 9 of the '349 Patent upon further discovery. Plaintiff does not assert infringement of claims 1-3 and 10-13 of the '349 Patent. CTP will notify the District of Maryland regarding the filing of this Complaint. Plaintiff anticipates that this matter will be promptly transferred for consolidation with MDL 14-MD-2581.

II. THE PARTIES

1. Plaintiff CTP Innovations, LLC ("CTP") is a Delaware limited liability company.

2. Upon information and belief, Schumann Printers, Inc., ("Defendant") is a Wisconsin corporation with its principal place of business located at 701 South Main Street, PO Box 128, Fall River, Wisconsin 53932. Defendant does business in Wisconsin, including in this district. Defendant may be served with process through service upon its registered agent, Daniel C. Schumann, located at, 701 South Main Street, PO Box 128, Fall River, Wisconsin 53932.

III. NATURE OF ACTION

3. This is a patent infringement action to stop Defendant's infringement of U.S. Patent No 6,611,349 (the "'349 Patent").

IV. JURISDICTION AND VENUE

4. This Court has subject matter jurisdiction over this action under 28 U.S.C. §§ 1331 and 1338(a) because it arises under the Patent Laws of the United States, United States Code, Title 35.

5. Venue is proper in this district under 28 U.S.C. §§ 1391(c) and 1400(b). On information and belief, Defendant has a regular and established place of business in this district, has transacted business in this district, and/or has committed acts of patent infringement in this district.

6. On information and belief, Defendant is subject to this Court's specific and general personal jurisdiction pursuant to due process and/or the Wisconsin Long Arm Statute, due at least to its substantial business in this forum including but not limited to: (i) at least a portion of the infringements alleged herein; and (ii) regularly doing or soliciting business, engaging in other persistent courses of conduct, and/or deriving substantial revenue from goods and services provided to individuals in Wisconsin and in this district.

V. GENERAL SUMMARY OF THE TECHNOLOGY AT ISSUE

7. The invention in the '349 Patent relates generally to the field of publishing and printing.

8. More specifically, the invention relates to systems and methods of providing publishing and printing services via a communication network involving computer to plate technology.

9. Simplistically, computer to plate technology involves transferring an image to printing plate without the middle step of creating a film of the image that is imprinted on the plate. The plate is then used in a printing press to transfer the image to different types of media, for example, but not by way of limitation, newspaper, card stock, or standard paper. By directly

transferring the image to the plate, the printing company eliminates the need for film and related developer chemicals, improves image quality, and may produce plates more quickly. The claimed methods and systems provide a solution for communicating and managing printing and publishing services without the need to physically transfer copies of design files and proofs through workflows that result in the generation of a plate ready file.

VI. BACKGROUND OF THE INVENTION IN THE '349 PATENT

10. Key steps for producing printed materials using a plate process include (1) preparing copy elements for reproduction, (2) prepress production, (3) platemaking, (4) printing, and (5) binding, finishing and distribution.

11. In the printing production process, an "end user" prepares copy elements for reproduction. In this "design" stage of the printing process, the end user provides images and data using slides or computer files to create one or more "pages." Pages can be designed using computer programs such as QuarkXpress, Adobe InDesign, Adobe Illustrator, Photoshop, or other printing or publishing software packages. Prior to the invention claimed in the '349 Patent, slides or computer disks containing pages to be printed were sent (via mail or express carrier) to be prepared for creation of a plate.

12. In the prepress production stage, the end user input (or "copy") is transformed into a medium that is reproducible for printing. Typically, prepress involves typesetting, illustration, page building and design, image capture, image color correction, file conversion, RIPing, trapping, proofing, imposition, filmsetting, and platesetting. "Proofing" involves producing a proof, or sample, of what the printed product will look like. Prior to the invention claimed in the '349 Patent, the proof was sent by mail or express carrier to the end user for review and approval. After alterations are made, new proofs are sent to the end user. Once approval of the proof is given by the end user, a medium, such as a computer to plate (CTP) file is produced and

sent to the printer. "Imposition" involves the set of pages on a particular plate as well as their positioning and orientation. Imposition is particularly important in the creation of booklets or catalogs, where pages are positioned using register marks to assist in the stripping, collating, and folding of the printed product.

13. In the platemaking stage, a "printer" manufactures a printing plate using the medium created during prepress. In the printing stage, the printer uses the printing plate to create the printed product. In the binding, finishing and distribution stage, the printed product is prepared in its final form.

14. Each step in the printing production process described briefly above can be accomplished using a variety of different known systems and techniques. Nevertheless, such conventional systems have many delays, particularly in the transporting of pages and proofs to and from the end user and prepress provider. Due to delays and the fragmented nature of conventional printing production systems, errors often occur. Further, typical printing production systems are limited in their ability to re-purpose data, manage content of pages, and piece together individual processes or tasks to establish an efficient production system or "workflow". Indeed, no conventional system prior to the invention claimed in the '349 Patent combines prepress, content management, infrastructure (server, storage & distribution) and workflow services.

15. Prior to the invention claimed in the '349 Patent, conventional printing and publishing systems generally include Macintosh computers or workstations which communicate with each other using the AppleTalk protocol. AppleTalk protocol could not, however, be communicated over switched networks such as the Internet and private networks where nodes in the network have IP (Internet Protocol) addresses. As such, conventional systems could not

merely be coupled to a communication network for remotely controlling design, prepress and print processes.

16. Prior to the invention claimed in the '349 Patent, there was a need for a system which combines design, prepress, content management, infrastructure (server, storage & distribution) and workflow. For end users in particular, there was a need for a system and a method to gain control of the design, prepress, and print processes. To save time and costs, there was a need to eliminate manual shipping of proofs back and forth to a prepress provider. Further, there was a need for a prepress capability at a local facility without the time and costs of shipping proofs back and forth to a prepress provider. Even further, there was a need for a system and method to provide plate-ready files over a communications network for delivery to a CTP device. Moreover, for commercial printers, there was a need for a system and method to remotely drive a plate-setting device located at a printer's facility. Further, there was a need to decrease the amount of time necessary to generate printing plates after processing of the pages (i.e., the cycle time). Even further, there was a need for providing access to the functionality of high-end server, storage, and networking equipment to the printer facility without the associated capital investments.

VII. *INTER PARTES* REVIEW

17. On July 29, 2013, Printing Industries of America ("PIA") filed a petition to institute an *inter partes* review proceeding with the United States Patent and Trademark Office's Patent Trial and Appeal Board ("PTAB"). That case was captioned *Printing Industries of America v. CTP Innovations, LLC* (Case No. IPR2013-00474) ("IPR2013-00474").

18. In IPR2013-00474, the petitioner challenged the validity of each and every claim in the '349 patent.

19. On December 31, 2013, PTAB found that the petition in IPR2013-00474 did not demonstrate that there was a reasonable likelihood that the petitioner would prevail with respect to invalidating at least one of the claims in the '349 Patent.

20. A true and correct copy of PTAB's determination in IPR2013-00474 is attached hereto as **Exhibit 1.**

21. On May 20, 2014, Eastman Kodak Company, Agfa Corporation, Esko Software BVBA and Heidelberg, USA filed *inter partes* review petitions IPR2014-00790 and IPR2014-00791 seeking review of all the claims of the '349 Patent.

22. On November 28, 2014, the PTAB took up the petitions and instituted review of claims 1-3 and 10-14 of the '349 Patent. Claims 4-9 of the '349 Patent are not part of the instituted review.

VIII. INFRINGEMENT OF THE '349 AND '155 PATENTS IS "UBIQUITOUS"

23. Upon information and belief, PIA is the largest trade association representing the printing and graphic communications industry in the United States.

24. Michael Makin, president and CEO of PIA (petitioner in IPR2013-00474) testified before the Senate Committee on the Judiciary, that the inventions in the '349 and '155 Patents

> relate[ ] to how a digital file, like a PDF file, is handled and manipulated in a print production operation up until the time it is used to image a printing plate. This method of digital workflow and plate imaging was new in the 1990s when the patent was issued but has become ubiquitous in the industry now.

Statement of Michael F. Makin, MBA, President & CEO of Printing Industries of America, Before the Senate Committee on the Judiciary, titled "Protecting Small Business and Promoting Innovation by Limiting Patent Troll Abuse," dated December 17, 2013 (the "PIA Statement"), at 4-5 (emphasis in original). A true and correct copy of the PIA Statement is attached hereto as **Exhibit 2**.

25. In so making this statement, it is clear that Makin and PIA were able to determine from the face of the '349 Patent that infringement of the '349 Patent was "ubiquitous in the industry now."

IX. CAUSES OF ACTION

COUNT I

26. CTP incorporates the preceding paragraphs 1-25 as though fully set forth herein.

27. CTP owns, by assignment, the '349 Patent entitled "System and Method of Generating a Printing Plate File in Real Time Using a Communication Network." A true and correct copy of the '349 Patent is attached hereto as **Exhibit 3**.

28. Upon information and belief, Defendant, in violation of 35 U.S.C. § 271, has infringed, literally or through the doctrine of equivalents, and continues to infringe at least claim 4 of the '349 Patent and likely claims 5-9 of the '349 Patent as well through Defendant's using a method of generating a plate-ready file configured for the creation of a printing plate, said plate-ready file being associated with page layouts and being provided in real time from a remote location using a communication network and selling and offering services that include this method (the "Infringing Services").

29. Defendant has not given the Infringing Services a specific and publicly-available name. Accordingly, Plaintiff cannot provide the name used by Defendant for such services without the benefit of discovery.

30. Exemplary Infringing Services include, without limitation, systems and methods used by Defendant in connection with, at least, its offset sheet-fed and web printing services that involve workflows related to plate-ready files and/or the generation of such files.

31. Exemplary Infringing Services do not include variable data printing because that type of printing does not involve the generation of a plate-ready file.

32. Defendant has sufficient experience and knowledge of computer to plate technology generally, and of its systems and methods specifically, to determine which of its systems and methods involve the generation of plate-ready files.

33. Defendant has sufficient experience and knowledge of computer to plate technology generally, and of its systems and methods specifically, to determine which of its systems and methods do not involve the generation of plate-ready files.

34. Defendant has had constructive and actual notice of the '349 Patent due to the significant publicity in the printing industry regarding the '349 Patent and lawsuits involving allegations of infringement of the '349 Patent.

35. Upon information and belief, Defendant was a member of PIA on December 17, 2013, when PIA's CEO, Mr. Makin testified before Congress. PIA issued a number of press releases regarding Mr. Makin's testimony, and during his testimony he directly referenced a cease and desist letter sent by CTP's counsel to an alleged infringer.

36. On information and belief, Defendant will continue to infringe the '349 Patent unless enjoined by this Court.

37. On information and belief, Defendant's infringement of the '349 Patent is, has been, and continues to be willful and deliberate in whole or in part because Defendant was aware of the '349 Patent from the substantial publicity in the printing industry relating to the '349 Patent, Defendant's membership in PIA, and Mr. Makin's testimony and related press releases.

Defendant has also received this Complaint, and yet continues to engage in its infringing conduct.

38. As a direct and proximate result of Defendant's infringement of the '349 Patent, CTP has been and continues to be damaged in an amount yet to be determined.

39. Unless Defendant's ongoing infringement is enjoined, CTP will suffer irreparable injury for which there is no adequate remedy at law.

40. This is an exceptional case such that CTP should be entitled to its reasonable attorney fees and expenses incurred in prosecuting this action and defending any counterclaims brought by Defendant.

IX. REQUEST FOR RELIEF

Wherefore, CTP requests the following relief:

1. A judgment in favor of CTP that Defendant has infringed claims 4-9 of the '349 Patent and that such infringement was willful;

2. A permanent injunction enjoining Defendant and its officers, directors, agents, servants, affiliates, employees, divisions, branches, subsidiaries, parents, and all other actors acting in active concert therewith from infringing the '349 Patent;

3. A judgment and order requiring Defendant to pay CTP its damages in an amount not less than a reasonable royalty, treble damages, costs, expenses, and prejudgment and post-judgment interest for Defendant's infringement of the '349 Patent, as provided under 35 U.S.C. § 284;

4. A judgment and order finding that this is an exceptional case within the meaning of 35 U.S.C. § 285, and awarding to CTP its reasonable attorney fees and expenses; and

5. Any and all other relief that the Court deems just and proper.

X. JURY DEMAND

CTP requests a jury for all issues so triable.

Respectfully submitted,

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Paper 16
Entered: December 31, 2013

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PRINTING INDUSTRIES OF AMERICA
Petitioner

v.

CTP INNOVATIONS, LLC
Patent Owner

Case IPR2013-00474
Patent 6,611,349

Before HOWARD B. BLANKENSHIP, BENJAMIN D. M. WOOD, and BRIAN J. MCNAMARA, *Administrative Patent Judges.*

WOOD, *Administrative Patent Judge.*

DECISION
Denying Petition to Institute *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

A. Background

Printing Industries of America ("PIA" or "Petitioner") filed a petition (Papers 3, 4,[1] "Pet.") to institute an *inter partes* review of claims 1-14 (the "challenged claims") of U.S. Patent No. 6,611,349 (Ex. 1101, "the'349 patent"). CTP Innovations, LLC ("CTP" or "Patent Owner") filed a Preliminary Response (Paper 11, "Prelim. Resp."). We have jurisdiction under 35 U.S.C. § 314.

The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides as follows:

> THRESHOLD – The Director may not authorize an inter partes review to be instituted unless the Director determines that the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.

Upon consideration of the Petition, the Preliminary Response, and the exhibits attached thereto, we determine that Petitioner has not shown a reasonable likelihood that the Petitioner would prevail with respect to at least one of the challenged claims. Accordingly, we do not authorize an *inter partes* review to be instituted as to the challenged claims.

B. Related Proceedings

In Appendix B of the Petition, PIA identifies 35 co-pending infringement actions involving the '349 patent. Pet., App. B. PIA has also petitioned for *inter*

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[1] The Petition cover sheet and tables of contents, authorities and exhibits were submitted separately from the body of the Petition, and have been collectively designated Paper 3. The body of the Petition has been designated Paper 4.

partes review of another patent at issue in the co-pending litigation, U.S. Patent No. 6,738,155. *See* IPR2013-00489, Papers 4, 5 (Aug. 2, 2013).

C. The '349 Patent

The '349 patent relates to "a system and method of providing publishing and printing services via a communication network." Ex. 1101, 1:9-10. According to the '349 patent, "[k]ey steps for producing printed materials using a plate process include (1) preparing copy elements for reproduction (the "design" stage), (2) prepress production, (3) platemaking, (4) printing, and (5) binding, finishing and distribution." *Id.* at 1:12-15. In the first step, an end user – e.g., a publisher, direct marketer, advertising agency, or corporate communication department – uses a desktop publishing program such as "QuarkXpress" to design "pages" from image and data files. *Id.* at 1:16-25. In the prepress production stage, the user-created pages (also called "copy") are "transformed into a medium that is reproducible for printing." *Id.* at 1:26-28. This transformation typically involves typesetting, image capture and color correction, file conversion, "RIPping, proofing, imposition, filmsetting, and platesetting." *Id.* at 1:29-32.

"RIPping" is based on the acronym "RIP," which stands for raster image processor. *Id.* at 7:57-59. A RIP is a hardware or software component that "rasterizes" an image file – i.e., converts it to a "bitmap" or raster image. *Id.* "RIPping" is, therefore, synonymous with rasterizing. A bitmap "is a digitized collection of binary pixel information that gives an output device, such [as a printer, proofer or platesetter,] the ability to image the file to paper, film or plate." *Id.* at 7:59-62. "Proofing" involves creating a sample of the finished product that is sent to the end user for approval. *Id.* at 1:32-35. "Imposition" involves arranging multiple pages into a single flat that can be used to create a printing

plate. *Id.* at 1:38-40. According to the '349 patent, imposition "is particularly important in the creation of booklets or catalogs, where pages are positioned using register marks to assist in the stripping, collating, and folding of the printed product." *Id.* at 1:41-44. A printer makes a plate based on the imposed flat and uses the plate on a printing press to reproduce the product; the product is bound, finished and distributed to create the product in its final form. *Id.* at 1:45-51.

The '349 patent describes and claims a publishing and printing system in which "system components are installed at an end user facility, a printing company facility, and a central service facility," each connected to the others via a communication network. *Id.* at 2:31-36, 51-56. Figure 1, reproduced below, depicts an embodiment of the claimed invention:

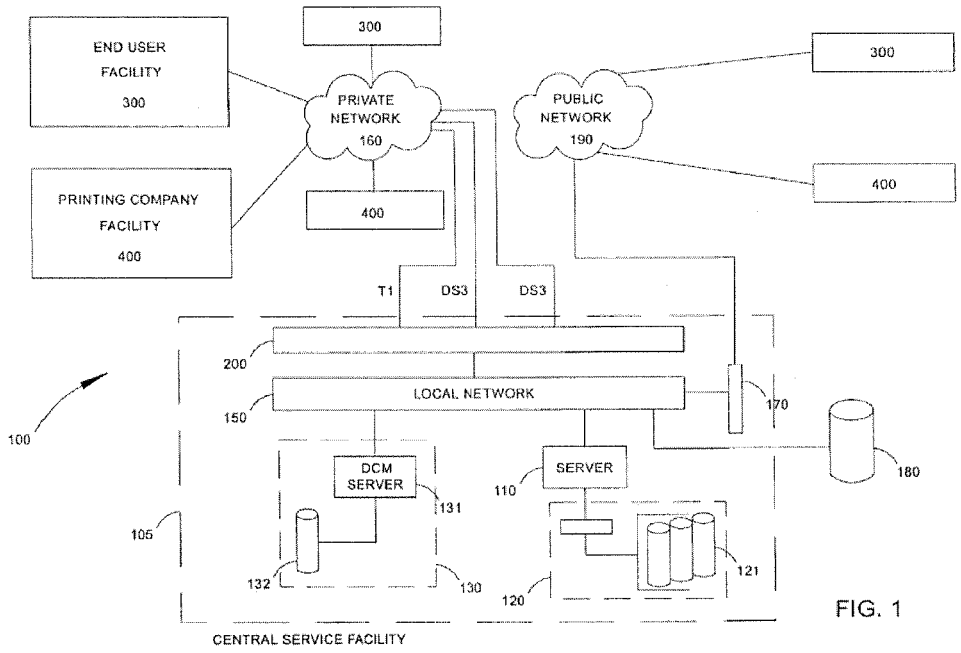

FIG. 1

Figure 1 depicts end user facility 300, printing company facility 400, and central service facility 105 connected together via either private network 160 or public network 190. *Id.* at Fig. 1. In this embodiment, end user facility 300

comprises a router, desktop computer for page-building operations, and a color proofer and black and white printer for high-resolution proofing. *Id.* at 7:38-40; Figs. 1, 2, 5. Printing company facility 400 comprises a router, a hub, a server, a laser printer, a color plotter, and a platesetter, and performs production management, digital plate-making, desktop imposition, and press services. *Id.* at 8:31-33; 9:38-43; Figs. 1, 4, 5. Central service facility 105 comprises a server, "hierarchical storage management" (HSM) system 120, "digital content management" system 130, and local area network (LAN) 150. *Id.* at 5:40-50. An end user can store files in HSM system 120 to reduce storage needs at the end user facility. *Id.* at 7:19-23, 38-40.

D. Exemplary Claims

Claims 1-4 and 10 are independent. Claims 1-3 are drawn to printing and publishing systems comprising an end user facility, a central service facility, and a printing company facility. Ex. 1101, 21:18-22:30. Claims 4 and 10 are drawn to methods of generating a plate-ready file configured for the creation of a printing plate. *Id.* at 22:31-48; 23:3-17. Claims 5-9 depend from claim 4. *Id.* at 22:49-23:2. Claims 11-14 depend, either directly or indirectly, from claim 10. *Id.* at 24:1-15.

Claims 1 and 4, reproduced below, are illustrative of the claimed subject matter:

> 1. A printing and publishing system which generates a printing plate-ready file from data provided remotely in real time using a communication network, the printing and publishing system comprising:
>
> an end user facility coupled to a communication network, the end user facility providing page building operations, the page building operations including the design and construction of pages from images, text, and data available via said communication network;

a central service facility coupled to said communication network, the central service facility providing storage, file processing, remote access, and content management operations; the file processing operations including generating a plate-ready file from pages designed at said end user facility, said plate-ready file having a file format capable of high resolution and ready for creation of a printing plate;

a printing company facility coupled to said communication network, the printing company facility providing printing operations, the printing operations including producing a printing plate from said plate-ready file; and

wherein the end user facility further comprises a communication routing device coupling the end user facility to the communication network, a computer which performs page building operations, and a proofer which provides printed samples of pages.

4. A method of generating a plate-ready file configured for the creation of a printing plate, said plate-ready file being associated with page layouts and being provided in real time from a remote location using a communication network, the method comprising:

remotely providing access to imaging files for searching and retrieving images used in the design of a page layout be a remote user,

establishing links to said image files, thereby creating a thin Postscript file from the page layout designed by the remote user;

parsing said thin Postscript file to extract data associated with low resolution images and replace with high resolution data, thereby forming a fat Postscript file,

creating a portable document format (PDF) file from said fat Postscript file, and

converting said PDF file to a file in plate-ready format.

E. Prior Art Relied Upon

PIA relies upon the following prior-art references:

Nusbickel	US 6,119,133	Sep. 12, 2000	Ex. 1103
Lucivero	US 7,242,487	July 10, 2007	Ex. 1106
Sands	US 5,634,091	May 27, 1997	Ex. 1107
Benson	EP App. 0878303	Nov. 18, 1998	Ex. 1108
Dorfman	EP App. 0920667	June 9, 1999	Ex. 1115

The Seybold Report on Publishing Systems, Vol. 27, No. 4 (Seybold Publications Oct. 27, 1997) (Ex. 1109) ("Seybold Vol. 27");

RICHARD M. ADAMS II ET AL., COMPUTER-TO-PLATE: AUTOMATING THE PRINTING INDUSTRY (Graphic Arts Technical Foundation 1996) (Ex. 1110) ("Adams II");

ALDUS CORP., OPI™ OPEN PREPRESS INTERFACE SPECIFICATION 1.3 (1993) (Ex. 1111) ("Aldus");

MATTIAS ANDERSSON ET AL., PDF PRINTING AND PUBLISHING, THE NEXT REVOLUTION AFTER GUTENBERG (Micro Publishing Press 1997) (Ex. 1112) ("Andersson");

The Seybold Report on Publishing Systems, Vol. 26, No. 20 (Seybold Publications Jul. 21, 1997) ("Seybold Vol. 26") (Ex. 1113);

Stephen N. Zilles, *Using PDF for Digital Data Exchange*, TAGA PROCEEDINGS 1997 (Ex. 1114) ("Zilles").

F. Asserted Grounds of Unpatentability

PIA contends that the challenged claims are unpatentable under 35 U.S.C. §§ 102 and/or 103 based on the following specific grounds (Pet. 18-60):[2]

[2] PIA also contends that claim 3 is indefinite under 35 U.S.C. § 112, paragraph 2. Pet. at 30-32. However, under 35 U.S.C. § 311(a) "[a] petitioner in an inter partes review may request to cancel as unpatentable 1 or more claims of a patent only on a ground that could be raised under section 102 or 103 and only on the basis of prior art consisting of patents or printed publications." We therefore do not consider PIA's asserted ground of unpatentability raised under § 112.

Reference[s]	Basis	Claims Challenged
Lucivero	§ 102	1
Nusbickel and Lucivero	§ 103	1
Nusbickel, Sands, and Benson	§ 103	1
Nusbickel, Lucivero, Seybold Vol. 27, and Adams II	§ 103	2
Lucivero, Nusbickel, and Sands	§ 103	3
Lucivero, Sands, Aldus, Andersson, Seybold Vol. 26, and Adams II	§ 103	4, 7
Lucivero, Sands, Zilles, and Andersson	§ 103	10-14
Lucivero, Sands, Aldus, Andersson, and Dorfman	§ 103	5, 6
Lucivero, Sands, Aldus, Andersson, and Benson	§ 103	8, 9

II. ANALYSIS

A. Claim Construction

As a step in our analysis for determining whether to institute a trial, we determine the meaning of the claims. Consistent with the statute and the legislative history of the AIA, the Board will interpret claims using the broadest reasonable construction. 37 C.F.R. § 100(b). We presume that claim terms retain their ordinary and customary meaning as would be understood by one of ordinary skill in the art at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). That presumption may be rebutted if the patent specification defines the term with reasonable clarity, deliberateness, and precision. *In re Paulson*, 30 F.3d 1475, 1480 (Fed. Cir. 1994); *see also In re Bigio*, 381 F.3d 1320, 1325-26 (Fed. Cir. 2004) ("Absent claim language carrying a

narrow meaning, the PTO should only limit the claim based on the specification or prosecution history when those sources expressly disclaim the broader definition."). If the specification does not expressly or implicitly define a claim term, it is appropriate to consult a general dictionary definition of the word for guidance in determining the ordinary and customary meaning of the claim term as viewed by a person of ordinary skill in the art. *Comaper Corp. v. Antec, Inc.*, 596 F.3d 1343, 1348 (Fed. Cir. 2010).

PIA proposes specific constructions for eight claim terms, which are summarized below:

Claim Term	Proposed Interpretation	Claims
end-user facility	facility that provides page building operations allowing the design and construction of pages from images, text, and data available via a communication network. Pet. 6.	1-3
communication network	both a private network 160 (ATM network) and a public network 190 (the Internet) of subscribers and non-subscribers to a printing and publishing system connected to central service facility 105. Pet. 6.	1-14
central service facility	providing storage, file processing, remote access, and content management operations. Pet. 7.	1-3
printing company facility	providing printing operations for producing a plate from said plate-ready file. Pet. 7.	1-3
communication routing device	routers and switches . . . included at central service facility 105, end user facility 300, and printing company facility 400. Pet. 7.	1, 3
plate-ready file	a file containing pages designed from images, texts, and data converted to a digital file for producing a printing plate	1-14
thin Postscript file	digital file containing low resolution	4-9

Claim Term	Proposed Interpretation	Claims
	images, graphics, texts, and art	
fat Postscript file	digital file containing high resolution images, graphics, texts, and art	4-9

CTP does not dispute PIA's proposed interpretations. *See generally* Prelim. Resp. Further, the proposed interpretations do not appear unreasonable at this stage of the proceeding. Therefore, we adopt PIA's proposed constructions for purposes of this decision.

B. Claim 1 – Anticipation – Lucivero

PIA contends that Claim 1 is anticipated by Lucivero under 35 U.S.C. § 102(e).

1. Lucivero

Lucivero discloses a system for creating, storing and processing raster data files. Ex. 1106, Abs; 6:26-28. The system allows an end user to control the workflow of bitmap files to a plurality of user-selectable output devices. *Id.* at 7:60-63, 8:30-35. The system comprises at least one terminal device on which an end user can create PostScript[3] image files, at least one RIP for converting PostScript files into bitmap files, and a print drive for receiving the bitmap file from the RIP and directing it to at least one output device, such as an imagesetter, platestetter, or large-format proofer. *Id.* at 5:61-67; 6:5-9; Fig. 2. Lucivero's system also contains a remote graphical user interface that allows a front end user to control print jobs over a "standard network environment." *Id.* at 5:41-60. The end user can select an off-line output device (also referred to as a "print engine"),

[3] "Postscript™," or PostScript™," refers to a page-description-language file format from Adobe Systems, Inc. Ex. 1106, 2:53-55.

execute a "print" command, view the status of jobs, and "manipulate and control the timing and priorities of the output." *Id.* at 5:11-17, 50-54.

2. Discussion

"Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim." *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1458 (Fed. Cir. 1984). Based on the record before us, we are not persuaded that PIA is reasonably likely to prevail in showing that Lucivero anticipates claim 1. Although PIA summarizes Lucivero (Pet. 18-19), and cites broad passages of Lucivero as corresponding to claim 1's limitations (Pet. 20-21 (claim chart)), PIA does not explain how the cited portions correspond to the limitation for which they are cited. Nor is such correspondence self-evident. For example, claim 1 recites an "end user facility providing page building operations," which includes "the design and construction of pages from images, text, and data *available via said communication network*." Ex. 1101, 21:23-27 (emphasis added). None of the Lucivero passages on which PIA relies seems to address this limitation.

Even if all of the claim 1 limitations were taught in the cited passages of Lucivero, it is unlikely that they would be "arranged as in the claim," i.e., as part of the same "printing and publishing system" as claim 1 recites. In *Net MoneyIN, Inc. v. Verisign, Inc.*, 545 F.3d 1359 (Fed. Cir. 2008), the Federal Circuit determined that the district court erred in concluding that a reference anticipates a claim because the district court combined parts of two separate examples described in the reference to find all of the elements of the claim. *Id.* at 1370-71. The court reasoned that a prior art reference that "includes multiple, distinct teachings that the artisan might somehow combine to achieve the claimed invention" is insufficient to show prior invention. *Id.* This principle applies here, because PIA

relies on at least two distinct embodiments in Lucivero to show anticipation of claim 1. PIA's anticipation analysis relies on a description of an embodiment that Lucivero describes as prior art (Pet. 20 (citing, e.g., Lucivero, 7:54-8-2 and Fig. 1)), and also on a description of an embodiment that Lucivero describes as "one embodiment of the present invention" (Pet. 20-21 (citing, e.g., 8:23-39, 41-67)). The anticipation analysis is, therefore, unpersuasive. Accordingly, we are not persuaded that PIA is reasonably likely to prevail on this ground of unpatentability.

C. Claim 1 – Obviousness – Nusbickel and Lucivero

PIA contends that the combination of Nusbickel and Lucivero renders obvious claim 1. Pet. 21-23.

1. Nusbickel

Nusbickel relates to online directory services – e.g., online equivalents to traditional phone books – in which information is provided over the Internet in response to a user request; the information is displayed by filling in fixed data fields in a presentation screen. Ex. 1103, 1:33-40; Figs. 1, 2. Figure 1 of Nusbickel depicts a functional block diagram of such a system. Web server 101 runs a web server application 103, which is coupled to database server 105. *Id.* at 3:50-53. Web server 101 is also connected to the Internet 107. *Id.* at 3:56-59. End user "data processing unit" 109, with web browser 111, is also connected to the Internet. *Id.* An end user queries database server 105 via Web browser 111, Internet 107, Webserver 101 and application 103. *Id.* at 4:10-14. The results of the query are returned to the end user in the same manner. *Id.* at 4:14-16. The invention in Nusbickel relates to a method of naming data files to simplify the retrieval of certain data. *Id.* at 4:66-5:16; Fig. 4.

2. Discussion

As with the previous alleged ground of unpatentability, PIA merely summarizes the references and cites broad passages of them as corresponding to claim 1's limitations, but does not explain how the cited portions correspond to the limitation for which they are cited. Nor is such correspondence self-evident. For example, it does not appear to us that either Nusbickel or Lucivero, individually or in combination, discloses the limitation requiring that the end user facility provide page building operations that include "the design and construction of pages from images, text, and data available via said communication network." Ex. 1101, 21:23-27. We discussed Lucivero's failure to disclose this limitation in sec. II.B.2. above. PIA also cites to Nusbickel 3:50-60, 4:16-46, and Figures 1 and 2, to disclose this limitation.[4] Nusbickel describes a data processing system for hosting Web pages, and a Yellow Pages directory listing service in which a user selects search criteria and retrieves search results that are displayed on a predefined screen layout. This disclosure does not, on its face at least, relate to the claim or limitation at issue. Therefore, we are not persuaded that PIA is reasonably likely to show that claim 1 is obvious over Lucivero and Nusbickel.

D. Claim 1 – Obviousness – Nusbickel, Sands, and Benson

PIA contends that the combination of Nusbickel, Sands, and Benson renders obvious claim 1. Pet. 24-27.

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[4] It is unclear whether PIA, by citing to two references to disclose the same limitation, contends that each reference fully discloses the limitation, or whether PIA relies instead on some combination of the two references to disclose the limitation.

1. Sands

Sands discloses a digital page imaging (DPI) system that automates the imposition process. A customer creates a digital document for printing, converts the document to a "page description language" format file (e.g., PostScript or PDF), and sends it via a communication network to the printer. Ex. 1107, 3:21-27. At the printer, the system assigns each page of the customer product into its exact position and orientation in a film flat. *Id.* at 3:64-67. The flat is then output to a film image setter for creating a printing plate. *Id.* at 3:10-14.

2. Benson

Benson relates to a "[d]istributed imaging and control architecture for digital printing presses and platesetters." Ex. 1108, cover page. The architecture comprises a job-control computer for selecting print jobs, and a separate image-control computer or computers for operating the various imaging devices. *Id.*

3. Discussion

As above, we are not persuaded that any of Nusbickel, Sands or Benson, individually or in combination, discloses the limitation requiring that the end user facility provide page building operations that include "the design and construction of pages from images, text, and data available via said communication network." Ex. 1101, 21:23-27. PIA cites to portions of all three references as disclosing this limitation. Pet. 27 (claim chart). For the reasons discussed above, we are not persuaded that the cited portions of Nusbickel disclose the limitation. PIA also cites to Sands, Ex. 1107, 3:19-42. Pet. 27 (claim chart). However, this provision of Sands instead discusses a DPI system that receives pages electronically in "page description language" format from multiple publishing systems and imposes them into plate-ready film flats. Ex. 1107, 3:19-42. Further, the portion of Benson on which PIA relies, 7:52-58, is not in the record. The only portions of Benson in the

record are its cover page and a related search report. *See generally* Ex. 1108. Therefore, we are not persuaded that PIA is reasonably likely to show that claim 1 is obvious over Nusbickel, Sands, and Benson.

E. Claim 2 – Obviousness – Seybold Vol. 27 and Adams II

PIA contends that Seybold Vol. 27 and Adams II render obvious claim 2. Claim 2 contains the same end-user-facility as claim 1, i.e., an end user facility that provides page-building operations "including the design and construction of pages from images, text, and data available via said communication network." Ex. 1101, 21:52-54. PIA relies on the same portions of Nusbickel and Lucivero to disclose this limitation as it did for claim 1. Pet. 30 (claim chart). For the reasons discussed above, however, we are not persuaded that Nusbickel and Lucivero, individually or combined, disclose this limitation. Therefore, we are not persuaded that PIA is reasonably likely to prevail on this ground of unpatentability.

F. Claim 3 – Obviousness – Lucivero, Nusbickel, and Sands

PIA contends that Lucivero, Nusbickel, and Sands render obvious claim 3. Claim 3 contains the same end-user-facility limitation as claim 1, i.e., an end user facility that provides page-building operations "including the design and construction of pages from images, text, and data available via said communication network." Ex. 1101, 22:9-11. PIA relies on the same portions of Nusbickel and Lucivero to disclose this limitation as it did for claim 1. Pet. 35 (claim chart). For the reasons discussed above, we are not persuaded that Nusbickel and Lucivero, individually or combined, disclose this limitation. Therefore, we are not persuaded that PIA is reasonably likely to prevail on this ground of unpatentability.

G. Claim 4 – Obviousness – Lucivero, Sands, Aldus, Andersson, Seybold Vol. 26, and Adams II

PIA contends that the combination of Lucivero, Sands, Aldus, Andersson, Seybold Vol. 26, and Adams II render obvious claim 4. Claim 4 is drawn to a method of generating a plate-ready file configured for the creation of a printing plate, the plate-ready file being associated with "page layouts." Ex. 1101, 22:31-48. Claim 4 requires, *inter alia*, the step of "remotely providing access to imaging files for searching and retrieving images used in the design of a page layout by a remote user." Ex. 1101, 22:36-38. PIA cites the following as allegedly disclosing this limitation: Lucivero, 6:63-67 and 9:1-4; Sands, 8:45-56; Aldus at 5, col. 1; and Seybold Vol. 26 at 21, ¶¶ 3, 4, and 7. PIA does not explain how the cited portions of these references correspond to the limitation in question. Nor do we discern any correspondence. The cited portions of Lucivero state:

> It is another object of the present invention to provide an electronic prepress system capable of reducing the time for the front-end to become free to send another job by allowing more jobs to be queued up to the RIP from the front-end. . . . It will be appreciated from FIGS. 2 and 3 that each RIP 34 on the network 35 can be accessed by any front-end 40 or by the server 42 or other computer system 45, any of which may be either local or remote.

Ex. 1106, 6:64-9:4. Petitioner does not explain the connection between these passages and the limitation at issue; nor is such connection evident. The cited portions of Sands, Aldus, and Seybold Vol. 26 likewise appear unrelated to this limitation. Therefore, we are not persuaded that PIA is reasonably likely to prevail on this ground of unpatentability.

H. Claim 10 – Obviousness – Lucivero, Sands, Zilles, and Andersson

PIA contends that Lucivero, Sands, Zilles, and Anderson render obvious claim 10. Claim 10 requires, *inter alia*, "storing high resolution files on a computer server" and "generating low resolution files corresponding to said high

resolution files." For the storing step, PIA relies on Lucivero, 21:53-63; Sands, 5:16-22; and Zilles at 313. Pet. 45 (claim chart). For the generating step, PIA relies on Sands, 5:16-22 and Andersson at 20. Even assuming that the storing step is disclosed in one or more of the prior art references cited by PIA, we are not persuaded that the cited passage of either Sands or Anderson discloses the generating step. The passage of Sands on which PIA relies discusses the operation of a typesetter that produces press film flats for plate making and printing. Ex. 1107, 5:16-22. The passage of Andersson on which PIA relies discusses the advantages of portable documents, as well as the characteristics of Acrobat Distiller, Acrobat Reader, and Acrobat Exchange. Ex. 1112 at 20.[5] Neither passage discusses the generation of low resolution files from high resolution files stored on a computer server. Therefore, we are not persuaded that PIA is reasonably likely to prevail on this ground of patentability.

I. The Remaining Grounds of Unpatentability

PIA's remaining grounds of unpatentability address claims that depend, either directly or indirectly, from one of claims 4 and 10. Pet. 46-60. Because we are not persuaded that PIA is reasonably likely to prevail on any of its asserted grounds of unpatentability of claims 4 and 10, we are also not persuaded that PIA is reasonably likely to prevail on any of its asserted grounds of unpatentability of the dependent claims.

III. CONCLUSION

We decline to institute an *inter partes* review of any of the challenged

[5] Also, notably, PIA does not argue expressly that a person of ordinary skill in the art would have had a reason to combine Andersson with the other references on which PIA relies. Pet. 45.

claims.

IV. ORDER

For the reasons given, it is

ORDERED that the Petition is denied as to all of the challenged claims of the '349 patent.

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PRINTING INDUSTRIES OF AMERICA | Advancing Graphic Communications

Statement of Michael F. Makin, MBA

President & CEO of

Printing Industries of America

Before the

Senate Committee on the Judiciary

"Protecting Small Business and Promoting Innovation by Limiting Patent Troll Abuse"

December 17, 2013

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I. Introduction

Thank you, Chairman Leahy and Ranking Member Grassley. It is a privilege to address the members of the Judiciary Committee on an issue very near and dear to the printing industry in America. Protecting small business and promoting innovation are passions of mine; therefore, I am pleased the Committee is examining the harm caused to both by abusive patent practices in this country.

Pure and simple, printers promote free speech. Our mission is entirely compatible with the promotion of progress and the useful arts which is the constitutional beacon of this nation's copyright and patent laws. Print is also the proverbial "poster child" for Main Street and small business.

Today I'm speaking on behalf of America's largest trade association representing the printing and graphic communications industry. There are more than 30,000 individual printing plants in this country in virtually every city and town in America. The average printing company employs just 27 workers and more than 60 percent of printing companies are family-owned businesses – a statistic to which I know the Chairman can relate personally. In aggregate, we employed over 800,000 workers and in 2012 shipped over $147 billion in products.

Print is an historic industry that traces its roots to Johannes Gutenberg and Benjamin Franklin; yet, its modern face is high-tech and innovative – it must be in order to survive. Today's print marketplace is all about using a cross-media mix to drive the economy. Companies are transforming themselves well beyond the traditional stereotype of a printer. They set up digital storefronts to make it easy for customers to order print over the Web; execute personalized marketing campaigns for customers that integrate print, digital communications, and social media; and offer a host of other services such as database management and fulfillment. Digital printing as a process has grown from just under one percent of the overall printing industry in 2009 to 10.6 percent in 2010 – and continues to be one of the fastest growing segments in our industry. In fact, many printing firms are changing their company names to reflect the new world of integrated communications.

Unfortunately, we're also an industry that has attracted the damaging attention of patent assertion entities (PAE) or "patent trolls." I realize that there is no concrete legal definition of a patent troll, so my testimony will be based on the belief that a PAE is a company whose business model is to obtain patents primarily to pursue licensing fees and/or litigation against manufacturers that are already using a patented technology. Patent trolls in our estimation do not innovate, do not promote economic growth, and do not contribute to the greater good of education or scientific research. Most importantly, patent trolls do not create jobs – our businesses do.

Patent trolls are increasingly aggressive and more and more predatory. A study commissioned by the US Government Accountability Office found trolls now account for almost 60 percent of patent infringement lawsuits in America. In 2011, patent troll activity cost the US economy $80 billion dollars and productive companies made $29 billion in direct payouts. In 2012, trolls sued more non-tech companies than tech, spanning a wide range of industries. Given all of this activity, it was only a matter of time before trolls began targeting America's quintessential small business industry – the printing and graphic communications industry – an industry in transition and one which employs new developing technologies every day.

II. Patent Trolls Target the Printing Industry

Prior to 2013, it was relatively unknown for printing companies to be accused of patent infringement. That is no longer the case. Owners of patents covering Quick Response (QR) codes, scanning, computer-to-plate workflow, and online ordering are all approaching printers demanding a licensing fee or threatening costly litigation. Currently we know of eight patent owners – many of which may be considered trolls – that are seeking licensing fees from printers. All encounters follow a similar path, with printers receiving a mailed letter, often from an attorney, alleging infringement of a specific technology used in the company's administration, production, or customer communications. The letter briefly describes the patents and technology in question and offers to provide a license for their continued use. The fee may be identified and the threat of a lawsuit is either stated or implied. Rarely will the patent owner provide specific evidence of infringement and the specific claims at issue.

For small printers especially, this is often their first experience with patent law and civil litigation – not to mention "trolling" – and they are astounded at the dollar figures included in these demand letters. One common demand letter issued to a Kansas printer with just 40 employees asked for a $75,000 licensing payment within two weeks of issuing its notice; after two weeks, the letters indicated the amount would rise to $95,000.

Needless to say threats of litigation are intimidating and place undue stress on an industry already struggling with low profits and challenging demand. The general estimate is that printers are forced to spend between $10,000 to $15,000 initially just to hire lawyers to investigate the claims of their apparent infringement. This is on top of anywhere from 125-150 hours printers must devote to this activity. One of our members in Colorado reports that he has a two-inch pile of patent claim charts on his desk; his company is already in its six month of ongoing patent troll activity.

Keep in mind, Mr. Chairman, that these are job creators in the manufacturing sector; these are not attorneys. Yet, there are now dozens upon dozens of printing company owners who have been forced to become patent ligation experts. As the president of one Virginia printing company aptly stated: "Patent trolling is a colossal distraction and…a drain on everybody."

III. Patent Trolls Chill Growth & Innovation in the Printing Industry

In our estimation, the stock-in-trade of patent trolls are software- and computer-related patents that have broadly written claims addressing the method of accomplishing certain activities. The patents are often years old with trolls asserting that their patents cover technology that has already advanced a generation or two since the patent was issued. In my written statement, I've included a chart that details the known patent infringement actions against the printing industry, but I would like to highlight three examples:

Computer-to-Plate Technology: This patent relates to how a digital file, like a PDF file, is handled and manipulated in a print production operation up until the time it is used to image a printing plate. This method of digital workflow and plate imaging was new in the 1990s when the patent was issued but has

become ubiquitous in the industry now. We believe there is compelling evidence to support that it should never have been issued to begin with and have a petition to this effect before the United States Patent & Trademark Office (PTO). Fast forward 15 years later, however, and a shell company run by lawyers, which acquired the antiquated patent and which has no technological or innovative tie to the patent, has issued demand letters to printers all over the United States seeking licensing fees or threatening litigation. At least 35 of these companies have been sued.

Web-to-Print Technology: In this case, the combined patents describe the use of an on-line system for pricing and accepting orders, accepting payment, checking inventory, preparing shipments and more. Thousands of companies inside and outside of the printing industry use this general method of accepting orders on-line today. To date, we know of seven printers – that have been sued based on this technology. Ironically, they are being sued based on technology methods invented in the mid-1990s to accept orders for products other than what our members produce. Essentially, the claims are from a pre-Internet era where nobody used a web portal to conduct business. The patent troll in this case will not even reveal how much the licensing fee is until a printer signs a non-disclosure agreement with it. So far, the printers in question have refused to sign.

QR Code Technology: This patent deals with a use of an "indirect link" – using a short URL, such as TinyURL, bitly, or any other shortener in a QR Code. Quick Response Codes are proven to make print advertisements and/or product packaging more effective. In fact, I would bet if you perused the advertising mail delivered to your homes today, you would find a printed catalog, a sales circular, a coupon, or even a political fundraising envelope with a QR Code on it. QR Codes are also commonly used in printed magazines and on billboards. The patent infringement cases related to these patents made news this year when well-known craft store chain Michael's was hit with a lawsuit for using QR codes in its printed circulars. Other brand name companies, such as Taco Bell and Bed, Bath & Beyond, have been sued as well. In an effort to embrace cross-media offerings that link printed material to mobile devices, printers flocked to offer QR codes and purchased the technologies and software from leading multi-billion dollar software companies. The current threat of litigation, though, now means that small printers may have to pull back on this competitive, high-tech offering due to it

becoming a litigation trap. If you're a small business owner with no in-house attorney, is it worth the risk of being targeted? Many have concluded it is not.

I cite these three examples because, Senators, I can assure you that if you ask small printers in the states you represent, the vast majority will tell you they consider using the above technology essential to their business growth and success. That they now even fear being competitive because of patent trolls who have no intellectual or innovative skin in the game is reprehensible in our view.

IV. Legislative Solutions to Combat Patent Troll Attacks on Printing Industry

Printing Industries of America commends this Committee for exploring legislative solutions to address the complexities of patent law, and we encourage a healthy debate on these ideas. Our overriding view is that legislation should deter patent trolls from the outset to protect printing companies from ever becoming part of the cycle of abusive patent litigation. However, if printers do in fact find themselves involved in extortionate legal situations, we hope that new laws will be in place to provide less costly, less burdensome courses of defense.

Solutions we support include:

Bad Faith Demand Letters

One of the fundamental problems with the current patent litigation system is the inherent vagueness that permeates it. Parties are able to send ambiguous letters en masse to industry members, such as those I have described received by members of the printing industry, demanding exorbitant sums of money. If a member company should have the fortitude to refuse these demands, they learn little more about the patent in question, the nature of infringement, or the party asserting the patent in the notice of suit. We believe a simple solution to this is to require parties asserting patent rights to include more information, both in the demand letters and in the pleadings they file.

Section 5 of S. 1720, the Patent Transparency and Improvement Act of 2013, introduced by Senators Leahy (D-VT) and Lee (R-UT), is directed at

fraudulent or misleading patent demand letters. Specifically, it is focused on the increasingly common practice of PAEs blanketing entire populations of potential patent infringers with unspecific written notices of potential infringement seeking remuneration. Oftentimes, these demand letters don't include information as to what the allegedly infringed patent covers or what the party receiving the notice is doing that infringes upon it.

Section 5 clarifies that the Federal Trade Commission (FTC) has the authority to target such abusive conduct as an unfair and deceptive trade practice. It is carefully crafted to avoid impinging on legitimate licensing activity by inventors and patent owners seeking to protect their rights. Because the FTC's mission is to prevent business practices that are deceptive of unfair to consumers, and to accomplish this without unduly burdening legitimate business activity, we believe that it is appropriate to enhance its enforcement authority.

This deceptive behavior at the core of bad faith demand letters is unacceptable. It does nothing to further the "arts and sciences" as the Founding Fathers envisioned of our patent system, but rather is increasingly the source of drag on our economy.

Heightened Pleading Requirements

Unfortunately, though, the lack of information in demand letters seems to be just the beginning of where the current patent litigation system falls short, in terms of providing information to the parties experiencing it. Another area that we believe could be improved is the pleading standard for patent infringement cases, which is currently far too low. Under current law, a patentee may file a complaint for patent infringement merely alleging that: (1) the court has jurisdiction; (2) the plaintiff owns the asserted patent; (3) the defendant is infringing that patent; and (4) the plaintiff notified the defendant of the alleged infringement. With respect to the third allegation (the statement of infringement), a patentee need assert only that the defendant has imported, made, used, sold, or offered to sell a product "embodying the patented invention." These sparse allegations fail to provide any notice as to what the patent actually covers, let alone what the defendant is doing that allegedly infringes upon it. This information is materially important for anybody, and

certainly member companies in the printing industry that are not as familiar with the patent system, to craft a response and legal strategy.

Section 2 of S. 1013, the Patent Abuse Reduction Act of 2013, introduced by Senator Cornyn (R-TX), requires more robust pleading requirements of patent infringement complaints to ensure that defendants are provided with full and fair notice of the asserted patent claims, the accused products, and the plaintiff's element-by-element infringement contentions for each accused product. We believe that this provision will not only inject balance into the patent judicial system, but will actually improve the quality of patent litigation. Requiring parties asserting patent rights to conduct a proper pre-filing investigation will limit the number of frivolous and baseless suits ever initially filed in our courts as well as put accused infringers immediately on notice of the patentee's infringement theories. This helps all interested parties—including the district court—understand the scope of the case from the start.

Customer Stay

We believe that it is imperative for legislation to address the sharp rise in the number of patent suits brought against end-users over the past several years. We have personally experienced the increasingly common PAE tactic of filing patent infringement suits against customers and/or users of a product or service, rather than the manufacturer or primary seller of the product or service. This is the nature of most of the suits brought against our smaller members. In testimony before the House Committee on the Judiciary on March 14, 2013, a member of this panel (Philip S. Johnson, Johnson & Johnson) aptly explained the prejudicial and coercive effects of current troll tactics to bring lawsuits against large numbers of printers, retailers and other end users rather than an original manufacturer:

> "This tactic takes advantage of the fact that such suits threaten defendants with the disruption of aspects of their businesses that are at best tangentially related to the invention which is the subject of the patent, and that each individual defendant has less motivation to litigate the issue to final conclusion that the manufacturer of the product at issue. The result can be to collect enormous sums as the result of a very large

> number of small settlements whose cumulative value far exceeds the amount that could have been recovered from the original manufacturer."

In practical printing industry terms, our member companies are saying, "We didn't write the code, we didn't develop the process,we didn't steal someone else's idea. Instead, we purchased software from billion dollar corporations who may or may not indemnify us…And even if they do, I'm still going to spend tens of thousands of dollars." A small printer in Kansas sums it up this way: "Everything I've done in this business has been 'by the book.' We go out and find a reputable vendor who has the technology we need and then we always buy the licenses and the maintenance agreements that go along with it. And now we're essentially being told by the troll 'we don't care what you did, you're doing it wrong'."

We believe that Section 5 of S. 1720 is a step forward in addressing these concerns. Although the courts currently may stay an infringement suit brought against customers and users down the distribution chain in favor of a suit against the manufacturer or supplier, many courts choose not to do so. Section 5 is designed to protect customers, who are targeted in patent infringement lawsuits by permitting the case against them to be stayed while the manufacturer litigates the alleged infringement.

<u>Covered Business Method</u>

Assertion of low quality, functional patent claims brought by trolls is another problem area that our member companies have faced first-hand this year. While Printing Industries of America was not involved in the patent reform debate last Congress, I do understand that the Covered Business Method (CBM) review program was implemented as part of the America Invents Act (AIA) as a solution to make it easier to have PTO review overbroad patents. CBM review offers an alternative to exorbitant litigation costs and allows businesses threatened over the same patent to pool resources to jointly file a CBM petition. However, the AIA limited CBM review to financial services patents that are non-technical. It is also a temporary program that ends in the year 2020.

On June 4th, 2013, the White House Task Force on High-Tech Patent Issues announced Executive Orders related to patent trolls. The White House

acknowledged that software patent applications are key to stopping the issuance of low quality, overbroad patents often used by trolls. Known as "functional patent claims," these allegations involve patents that claim a general idea. The advocacy group PatentProgress.org describes functional patent claims as "claims that drive us all crazy, where a patent just claims a general idea, like…filtering files that might be spam, or scanning documents and sending by email, or backing up your computer over a network." It is the type of patent that trolls are using to attack the printing industry. For example, printers have received infringement claims for use of a functional software patent that allows for scanning equipment to send scanned images directly to email on an internal network or an FTP/SFTP site. While this particular PAE has sent letters to our member companies withdrawing claims following the action of deep-pocketed suppliers filing invalidation claims at PTO, it serves as an example of how patent trolls are wreaking havoc in the basic operation of printing companies.

S. 866, the Patent Quality Improvement Act of 2013, introduced by Senator Schumer (D-NY), also addresses this problem. S. 866 would expand and make permanent CBM review in current law to go beyond financial services products. As Senator Schumer explained in an op-ed in the Wall Street Journal on June 12, 2013,

> "The expansion of [CBM review] will benefit businesses in multiple ways. For any business that has actually been sued, it provides a cheaper exit strategy. More broadly, the very existence of this off-ramp will discourage trolls from suing. If a troll knows he can no longer trap a defendant in expensive and lengthy litigation, his interest in the suit will diminish substantially. And American businesses can get back to the work of innovation and growth, rather than frivolous litigation defense."

We support the concept of expanding CBM review in order to deter patent troll activity. We also realize that there is some controversy over this idea – and, in particular, dissent from our view by some of our valued supply chain partners – due to the question of how and/or if it is possible to separate "bad actors" from patent holders that do not proactively engage in trolling behavior. It's clear, though, that the Senate should address the issue of patent

quality, and I encourage the Committee to work together to best achieve a consensus solution if at all possible.

More Transparency of Patent Ownership

Virtually all of the bills introduced to date recognize the need for greater transparency into who is the real party-in-interest for the patent. Section 3 of S. 1720 is drafted to promote transparency in patent ownership by requiring plaintiffs who file a patent infringement lawsuit to disclose patent ownership and financial interests.

We are greatly encouraged Congress is taking such an active interest in the need to preserve the "grand bargain" of the patent system: namely, a party seeking exclusive control over an invention must disclose not only the scope of their invention but also who they are. Like real estate or other forms of property (e.g., an automobile), it is appropriate that government records reflect who owns patent rights. As another panelist (Dana Rao of Adobe Systems) explained during House testimony on March 14th of this year: "If anything, the expectation [of transparency] should be greater in patent cases given the ability to enforce that right through litigation and the strict liability for infringement."

We could not agree more. As honest small businesses without access to in-house legal counsel, end users – like printers -- of patented technologies would greatly benefit from knowledge about the ownership and financial interests of our adversaries.

Balancing Discovery Demands

The printing industry currently faces a lose-lose situation of either settle with a patent troll for some high five or six-figure number or mount an expensive legal defense. For most who cannot afford to mount a multi-million dollar legal defense, the only choice they have is to settle. The high price of defending patent infringement lawsuits is due, in large part, to out-of-control discovery demands and costs. Under current law, even plaintiffs asserting meritless infringement claims often are allowed to impose expensive

discovery demands on accused infringers, even before the parties know what the patent legally covers.

Section 4 of S. 1013 includes provisions address limiting discovery. As I stated previously, we have found that PAEs commonly bring lawsuits accusing broad swaths of the defendants' businesses without any realistic expectation that they will pursue those assertions to trial. This practice creates high, unnecessary discovery costs for the defendants at the beginning of lawsuits. S. 1013 would limit discovery initially to the information necessary to resolve the claim interpretation dispute. As an initial matter, this would address the high cost of patent litigation by staying discovery until a court has had the opportunity to narrow a case to its appropriate dimensions and/or potentially decide a motion to dismiss based on the scope of the patent claims. By ensuring that parties are not faced at the outset of a case with extensive discovery demands that could end up having nothing to do with the case, we believe that more of our members will be empowered to fight frivolous claims of infringement rather than settle.

Additionally, Section 4 of S. 1013 would limit initial discovery to the essential documents that both sides need in order to litigate their claims and defenses, such as information about the patents and core technical documents about the accused devices. We believe that this would direct courts to rein in out-of-balance discovery demands and require parties to anticipate and propose solutions for potential discovery abuses as an initial matter. Critically, this provision also requires that parties who later seek discovery beyond the core documents must pay for the costs of that discovery. Any party seeking that additional discovery must prove that it has the financial resources to pay for the discovery or post a bond with the court covering those costs. This provision is vital to protecting defendants from abusive litigation and is not only supported by the printing industry but an extensive cross section of industry, as demonstrated by a letter sent to Congress earlier this year that I have included as an attachment. Often PAEs have few, if any documents, while defendants are legitimate businesses with a large amount of information. By forcing defendants to produce documents, PAEs drive up the cost of litigation, forcing defendants to settle. This provision reduces that abuse. If PAEs really want additional discovery beyond what is necessary to resolve the litigation, then they should bear the cost of that discovery.

The cost of mounting a legal defense is increasingly a drain on our industry. As a printer in Colorado recently said, "The game is simple—sooner or later the patent holder expects that I'll conclude paying them is cheaper than going to court. I don't think that they really believe they have a patent covering what I do. Every conversation is about a settlement."

We believe, though, that reasoned and moderate reforms, such as ensuring balance in discovery demands, will ensure that small printers – and small businesses in general – have a fighting chance in the current system.

Awarding Fees to Prevailing Parties

We would encourage the Committee to consider amending the current Section 285 of the Patent Code, which allows a party to recover fees and expenses in "exceptional cases." Under current law, this standard, in practice, means that fees are almost never awarded, even in the most egregious of cases. As I have explained earlier, we believe that it is imperative to ensure that the system not only secures the ability for patent holders to protect their rights, but also the ability for those accused of infringement to defend themselves. By providing greater direction for courts to award fees to prevailing parties, we think that more of our members would choose to fight claims of infringement, rather than settle. Both the S. 1013 and S. 1612, the Patent Litigation Integrity Act, introduced by Senator Hatch (R-UT), recognize that end-of-case fee shifting is the simplest way to restore the proper financial accountability in the patent system by reducing the incentives to filing unnecessary, abusive, and burdensome litigation.

Assistance for Small Printers: Education, Outreach, and Information Access

Regarding small printers, today I have shared the confusion, exasperation, costs and diversion of resources experienced by small printers that are targeted by abusive patent practices. While small printers are not the type to come hat in hand to the government for help in managing their companies, they do appreciate the intent of S. 1720 to direct the PTO to develop educational outreach and online assistance tools designed specifically for small businesses. Should a small printing company find itself as a defendant in a baseless patent infringement case, this assistance will provide great value. We support Section 6 of S. 1720.

V. Conclusion

Without a doubt, both small business and innovation drive the spirit and economy of this nation, and both should be protected from abusive patent trolls. I commend the Committee for its action and bipartisanship on this issue. Clearly, there is a complex, critical intersection between technology and innovation, economic productivity and growth, and laws that protect valid intellectual property. I hope the debate in this committee room today and in future Senate proceedings will seek to balance these important goals. There won't be one simple solution to reform our nation's patent process, but, to borrow a phrase from President Obama, it's critical that we build consensus to produce "smarter patent law."

Printing Industries of America looks forward to supporting that effort. I note for the record that all of our regional, state and local affiliated associations are also strongly supportive of this effort and I am including a letter to that effect. Again, thank you for the opportunity to address the Committee. I look forward to answering your questions.

US006611349B1

(12) **United States Patent**
Vogt et al.

(10) **Patent No.: US 6,611,349 B1**
(45) **Date of Patent: Aug. 26, 2003**

(54) **SYSTEM AND METHOD OF GENERATING A PRINTING PLATE FILE IN REAL TIME USING A COMMUNICATION NETWORK**

(75) Inventors: **Joyce E. Vogt**, Waconia, MN (US); **Jeffrey A. Bartol**, New Hope, MN (US); **John H. Chase**, Stillwater, MN (US); **Scott R. Rosenlund**, Chaska, MN (US)

(73) Assignee: **Banta Corporation**, Menasha, WI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/365,365**

(22) Filed: **Jul. 30, 1999**

(51) **Int. Cl.**[7] **G06K 15/00**
(52) **U.S. Cl.** **358/1.15**; 358/1.18
(58) **Field of Search** 358/1.15, 1.2, 358/1.12, 1.18

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6,239,802 B1 * 5/2001 Lahey 345/352
2001/0011283 A1 * 8/2001 Kato 707/511

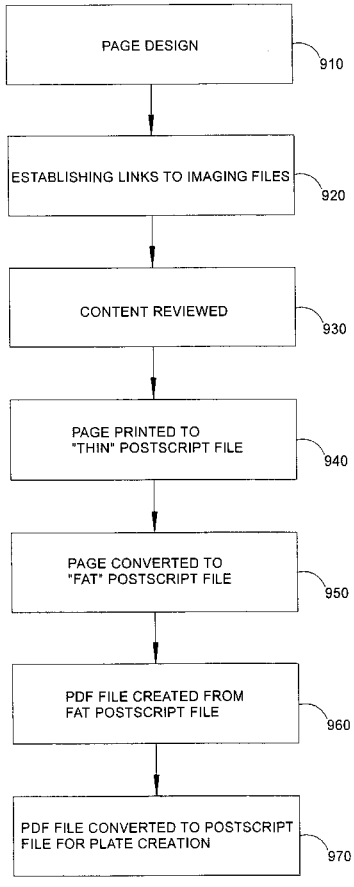
* cited by examiner

Primary Examiner—Jerome Grant, II
(74) *Attorney, Agent, or Firm*—Foley & Lardner

(57) **ABSTRACT**

A printing and publishing system which generates a printing plate-ready file from data provided remotely in real time using a communication network is disclosed herein. The printing and publishing system includes a central service facility and an end-user facility and/or a printing company facility. The end user facility provides page building operations allowing the design and construction of pages from images, text, and data available via said communication network. The central service facility provides storage, file processing, remote access, and content management operations. File processing operations include generating a plate-ready file from pages designed at said end user facility. The plate-ready file has a file format capable of high resolution and is ready for creation of a printing plate. The printing company facility provides printing operations for producing a printing plate from said plate-ready file.

14 Claims, 19 Drawing Sheets



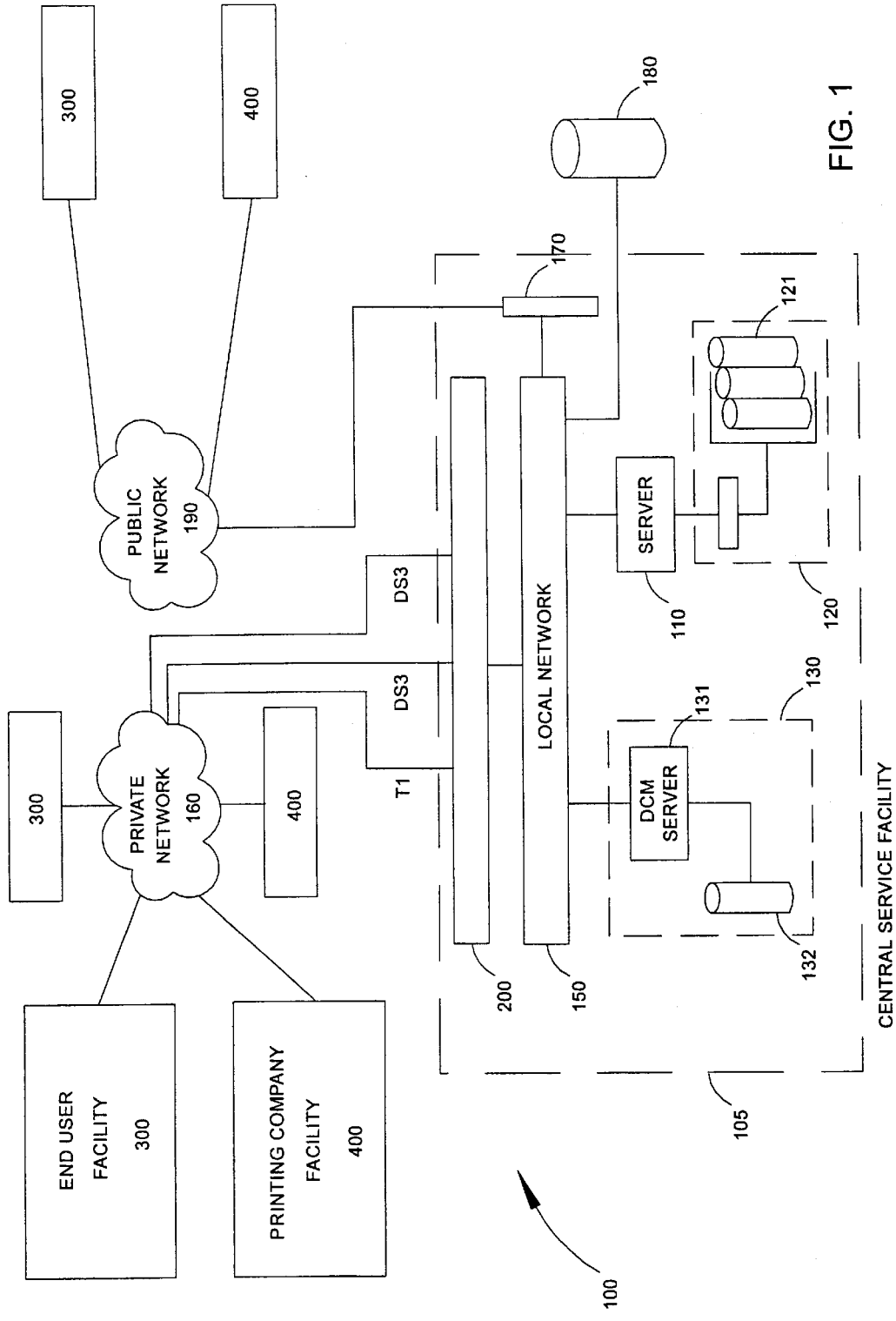

300
400
180
170
121
PUBLIC NETWORK 190
SERVER
110
120
DS3
DS3
LOCAL NETWORK
130
131
300
PRIVATE NETWORK 160
400
T1
DCM SERVER
132
200
150
CENTRAL SERVICE FACILITY
105
END USER FACILITY 300
PRINTING COMPANY FACILITY 400
100

FIG. 1

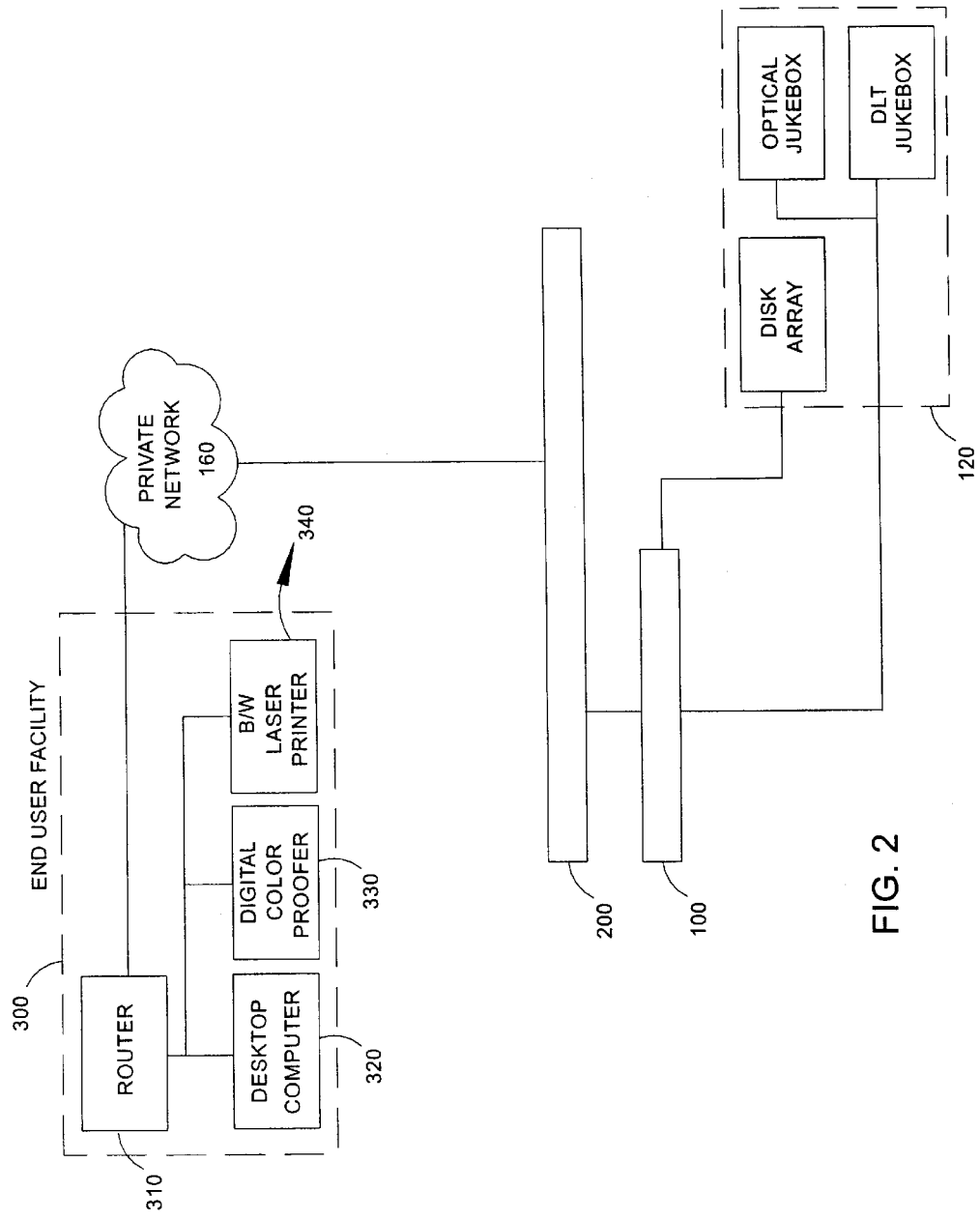

OPTICAL JUKEBOX
DLT JUKEBOX
DISK ARRAY
120
PRIVATE NETWORK 160
340
END USER FACILITY
B/W LASER PRINTER
DIGITAL COLOR PROOFER
330
DESKTOP COMPUTER
320
ROUTER
310
300
200
100

FIG. 2

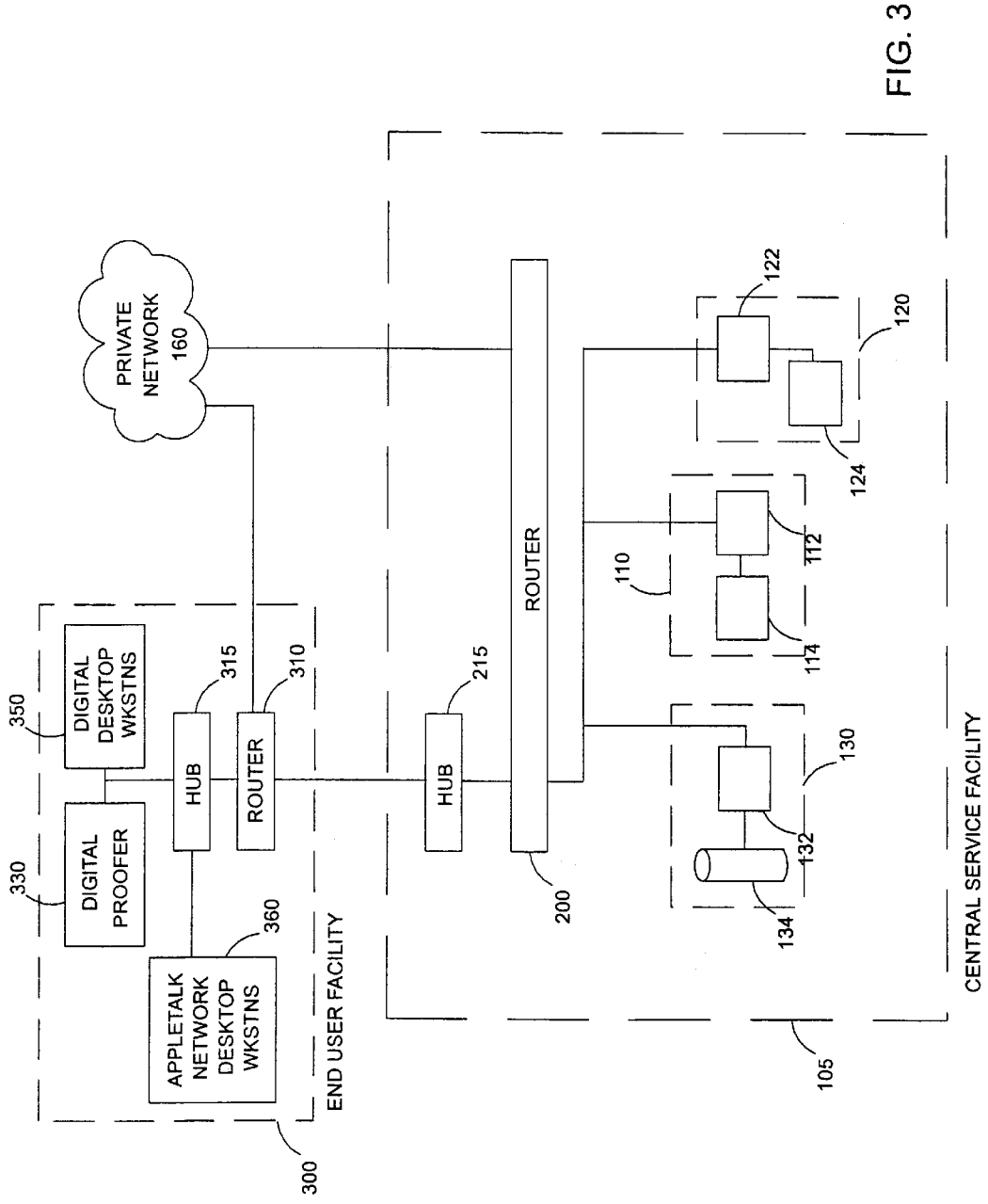

PRIVATE NETWORK 160
DIGITAL DESKTOP WKSTNS
DIGITAL PROOFER
HUB
ROUTER
APPLETALK NETWORK DESKTOP WKSTNS
HUB
ROUTER
122
120
124
112
110
114
130
132
134
350
330
315
310
360
215
200
105
300
END USER FACILITY
CENTRAL SERVICE FACILITY

FIG. 3

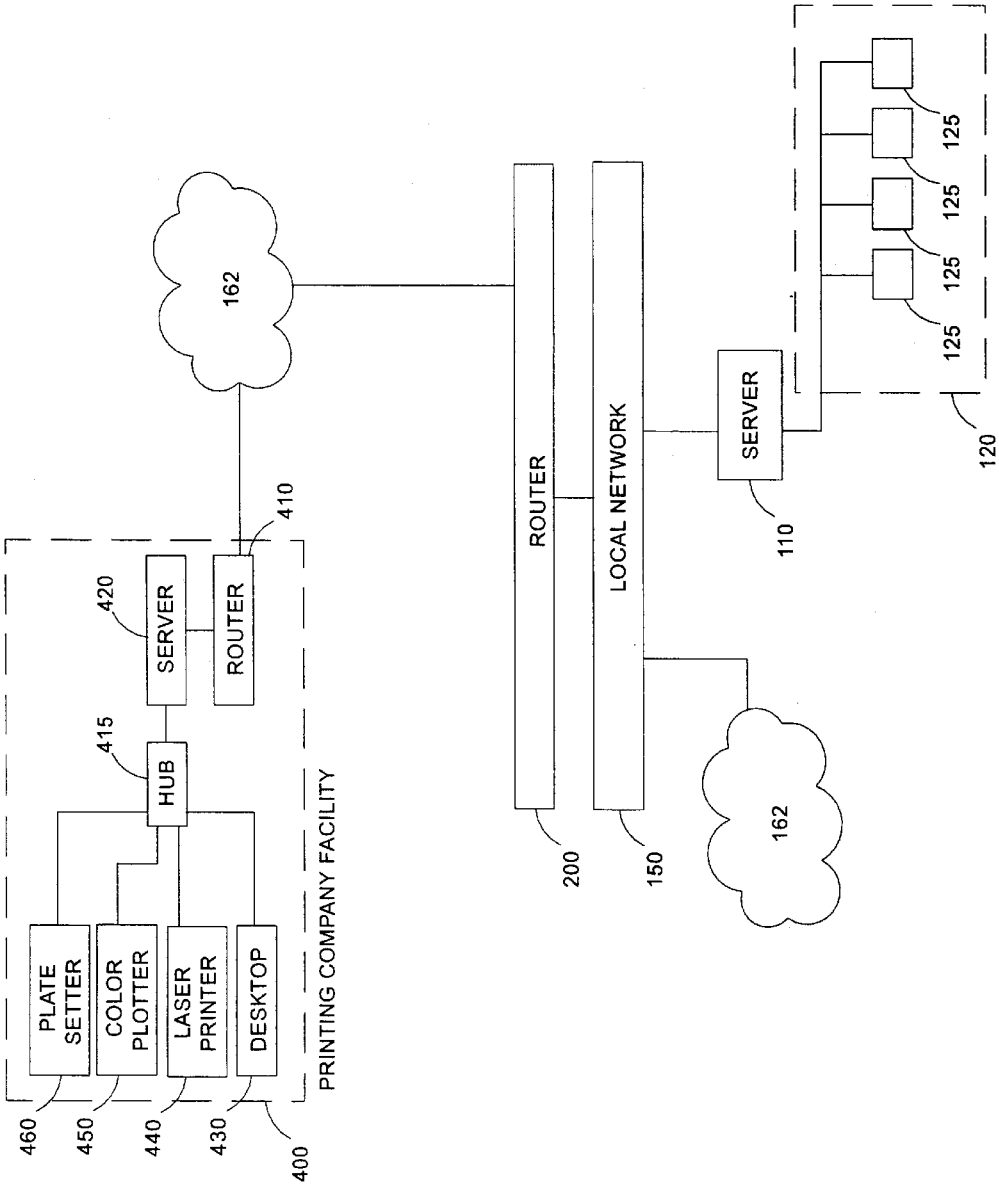

162
ROUTER
LOCAL NETWORK
SERVER
125
125
125
125
120
110
200
150
162
410
420
SERVER
ROUTER
415
HUB
PLATE SETTER
COLOR PLOTTER
LASER PRINTER
DESKTOP
PRINTING COMPANY FACILITY
460
450
440
430
400

FIG. 4

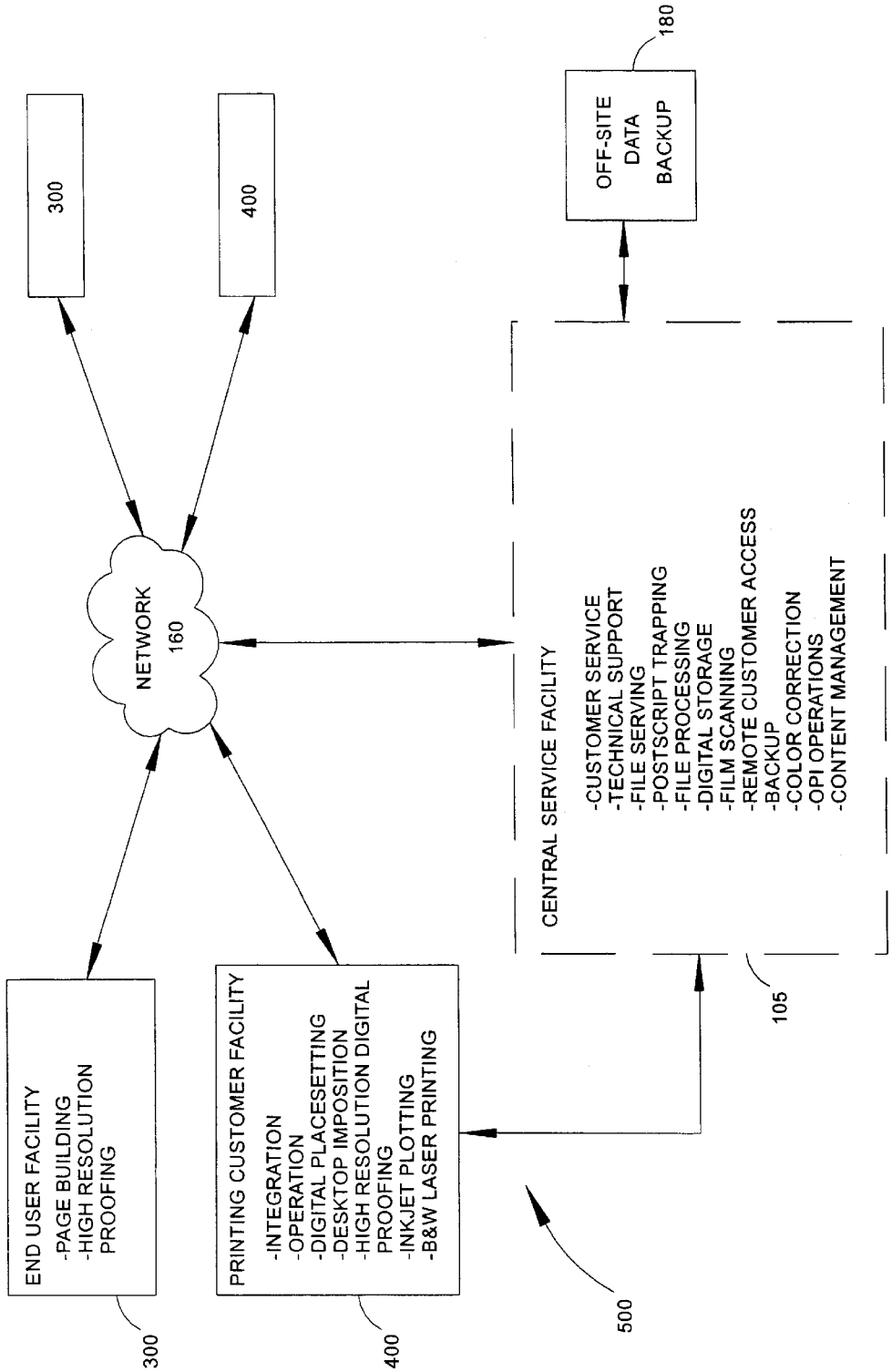

300
400
180
OFF-SITE DATA BACKUP
NETWORK 160
CENTRAL SERVICE FACILITY
-CUSTOMER SERVICE
-TECHNICAL SUPPORT
-FILE SERVING
-POSTSCRIPT TRAPPING
-FILE PROCESSING
-DIGITAL STORAGE
-FILM SCANNING
-REMOTE CUSTOMER ACCESS
-BACKUP
-COLOR CORRECTION
-OPI OPERATIONS
-CONTENT MANAGEMENT
105
END USER FACILITY
-PAGE BUILDING
-HIGH RESOLUTION PROOFING
300
PRINTING CUSTOMER FACILITY
-INTEGRATION
-OPERATION
-DIGITAL PLACESETTING
-DESKTOP IMPOSITION
-HIGH RESOLUTION DIGITAL PROOFING
-INKJET PLOTTING
-B&W LASER PRINTING
400
500

FIG. 5

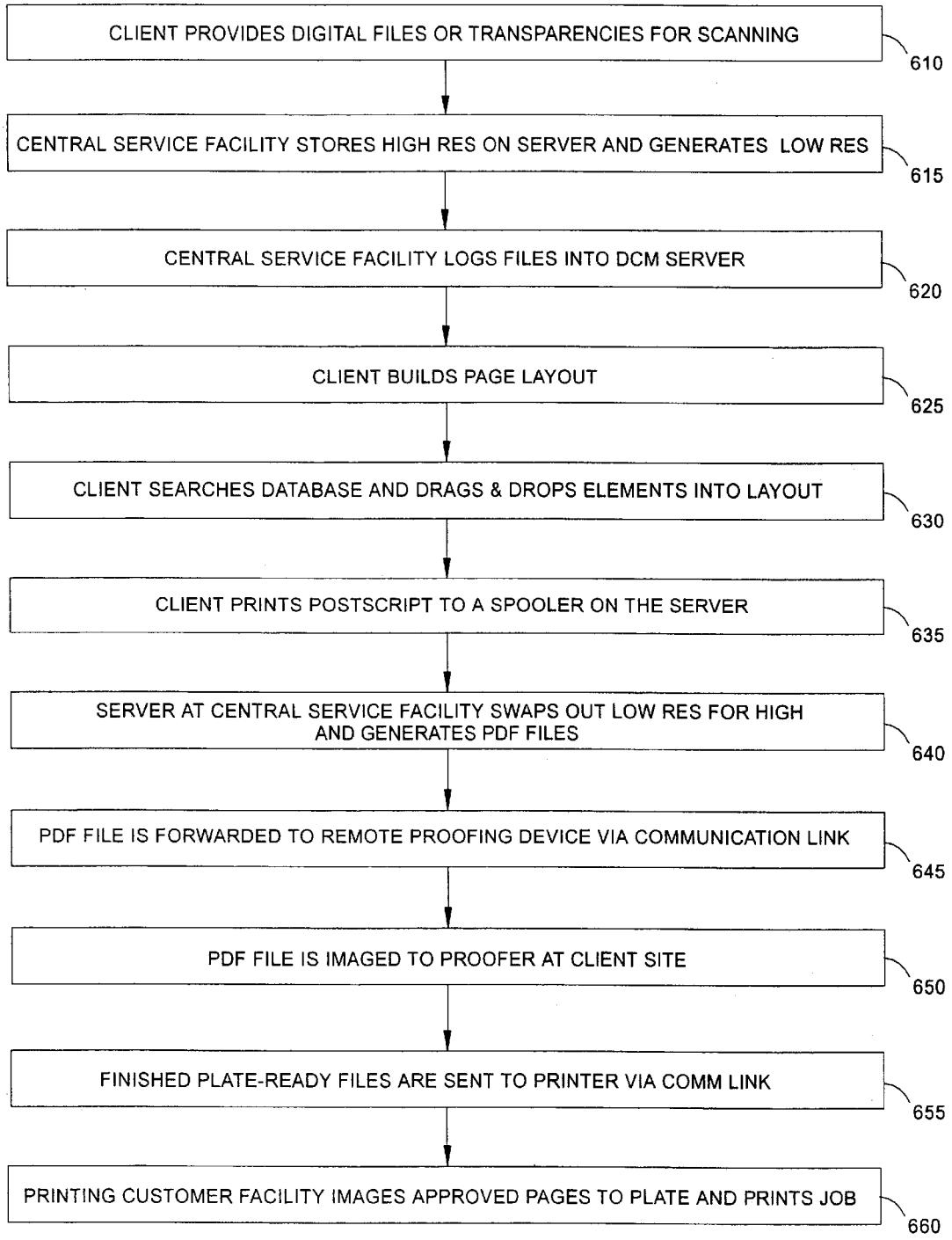

CLIENT PROVIDES DIGITAL FILES OR TRANSPARENCIES FOR SCANNING
610
CENTRAL SERVICE FACILITY STORES HIGH RES ON SERVER AND GENERATES LOW RES
615
CENTRAL SERVICE FACILITY LOGS FILES INTO DCM SERVER
620
CLIENT BUILDS PAGE LAYOUT
625
CLIENT SEARCHES DATABASE AND DRAGS & DROPS ELEMENTS INTO LAYOUT
630
CLIENT PRINTS POSTSCRIPT TO A SPOOLER ON THE SERVER
635
SERVER AT CENTRAL SERVICE FACILITY SWAPS OUT LOW RES FOR HIGH AND GENERATES PDF FILES
640
PDF FILE IS FORWARDED TO REMOTE PROOFING DEVICE VIA COMMUNICATION LINK
645
PDF FILE IS IMAGED TO PROOFER AT CLIENT SITE
650
FINISHED PLATE-READY FILES ARE SENT TO PRINTER VIA COMM LINK
655
PRINTING CUSTOMER FACILITY IMAGES APPROVED PAGES TO PLATE AND PRINTS JOB
660

FIG. 6

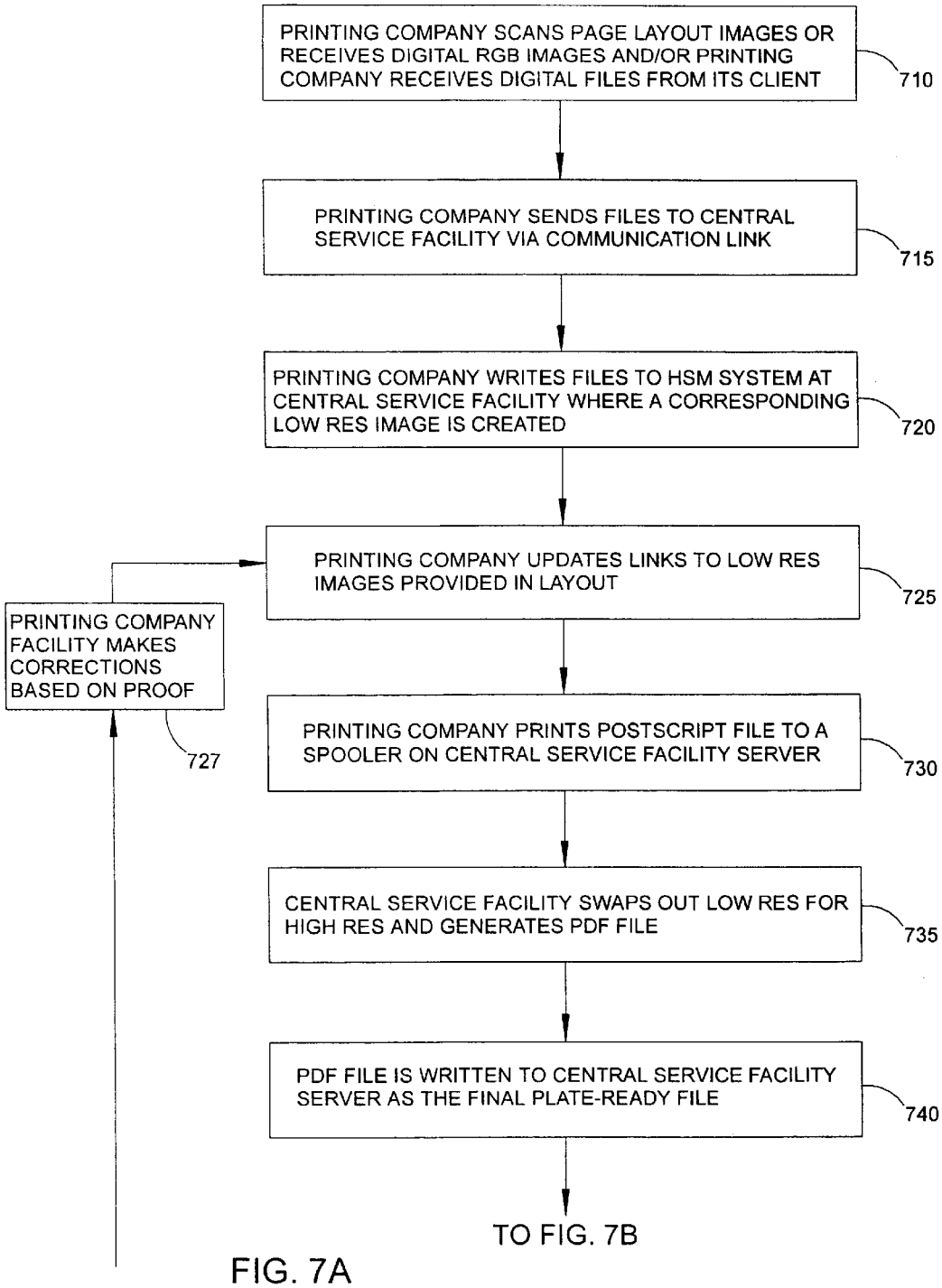

PRINTING COMPANY SCANS PAGE LAYOUT IMAGES OR RECEIVES DIGITAL RGB IMAGES AND/OR PRINTING COMPANY RECEIVES DIGITAL FILES FROM ITS CLIENT
710
PRINTING COMPANY SENDS FILES TO CENTRAL SERVICE FACILITY VIA COMMUNICATION LINK
715
PRINTING COMPANY WRITES FILES TO HSM SYSTEM AT CENTRAL SERVICE FACILITY WHERE A CORRESPONDING LOW RES IMAGE IS CREATED
720
PRINTING COMPANY UPDATES LINKS TO LOW RES IMAGES PROVIDED IN LAYOUT
725
PRINTING COMPANY FACILITY MAKES CORRECTIONS BASED ON PROOF
727
PRINTING COMPANY PRINTS POSTSCRIPT FILE TO A SPOOLER ON CENTRAL SERVICE FACILITY SERVER
730
CENTRAL SERVICE FACILITY SWAPS OUT LOW RES FOR HIGH RES AND GENERATES PDF FILE
735
PDF FILE IS WRITTEN TO CENTRAL SERVICE FACILITY SERVER AS THE FINAL PLATE-READY FILE
740
TO FIG. 7B

FIG. 7A

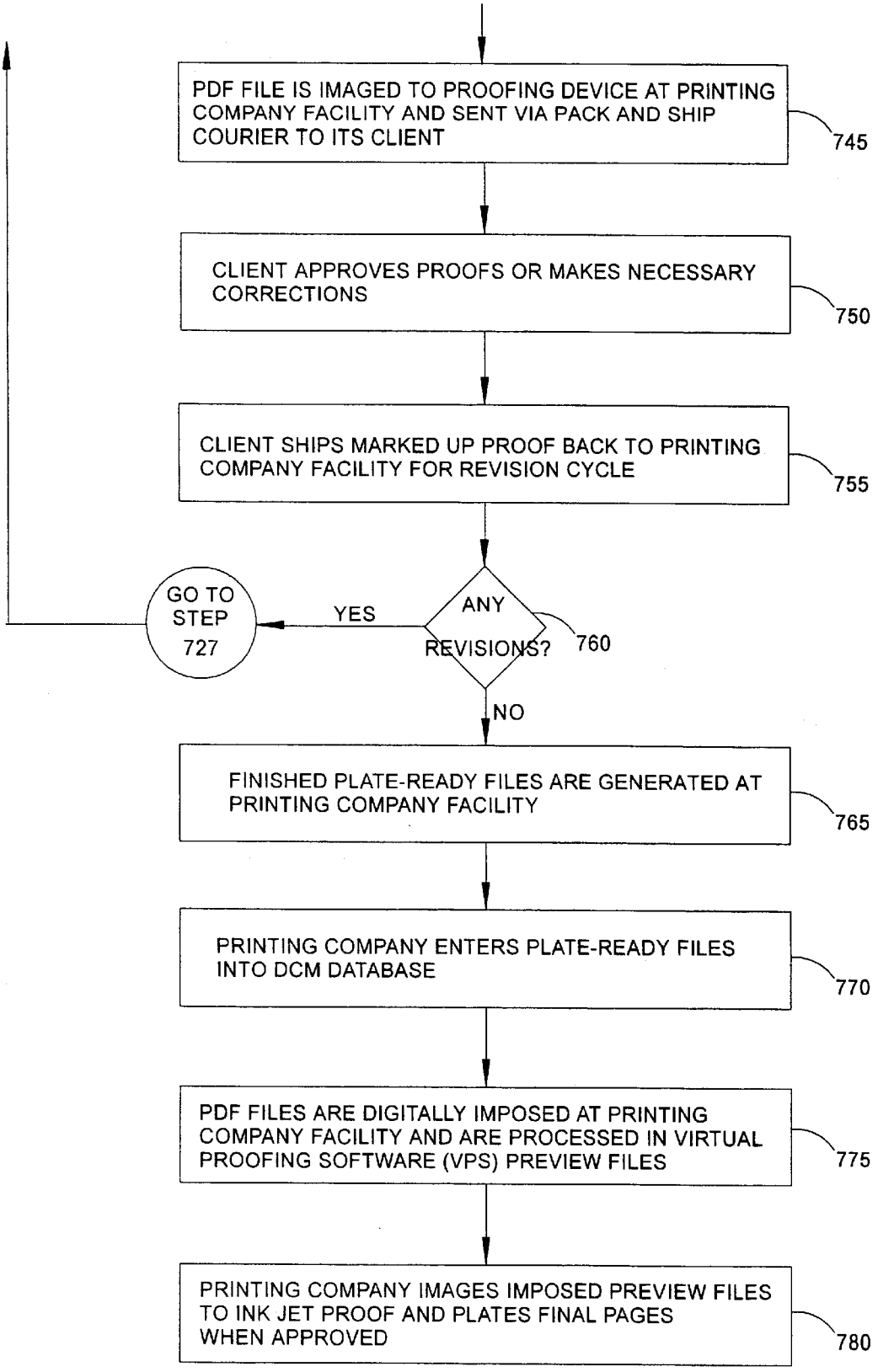

PDF FILE IS IMAGED TO PROOFING DEVICE AT PRINTING COMPANY FACILITY AND SENT VIA PACK AND SHIP COURIER TO ITS CLIENT
745
CLIENT APPROVES PROOFS OR MAKES NECESSARY CORRECTIONS
750
CLIENT SHIPS MARKED UP PROOF BACK TO PRINTING COMPANY FACILITY FOR REVISION CYCLE
755
ANY REVISIONS?
760
YES
GO TO STEP 727
NO
FINISHED PLATE-READY FILES ARE GENERATED AT PRINTING COMPANY FACILITY
765
PRINTING COMPANY ENTERS PLATE-READY FILES INTO DCM DATABASE
770
PDF FILES ARE DIGITALLY IMPOSED AT PRINTING COMPANY FACILITY AND ARE PROCESSED IN VIRTUAL PROOFING SOFTWARE (VPS) PREVIEW FILES
775
PRINTING COMPANY IMAGES IMPOSED PREVIEW FILES TO INK JET PROOF AND PLATES FINAL PAGES WHEN APPROVED
780

FIG. 7B

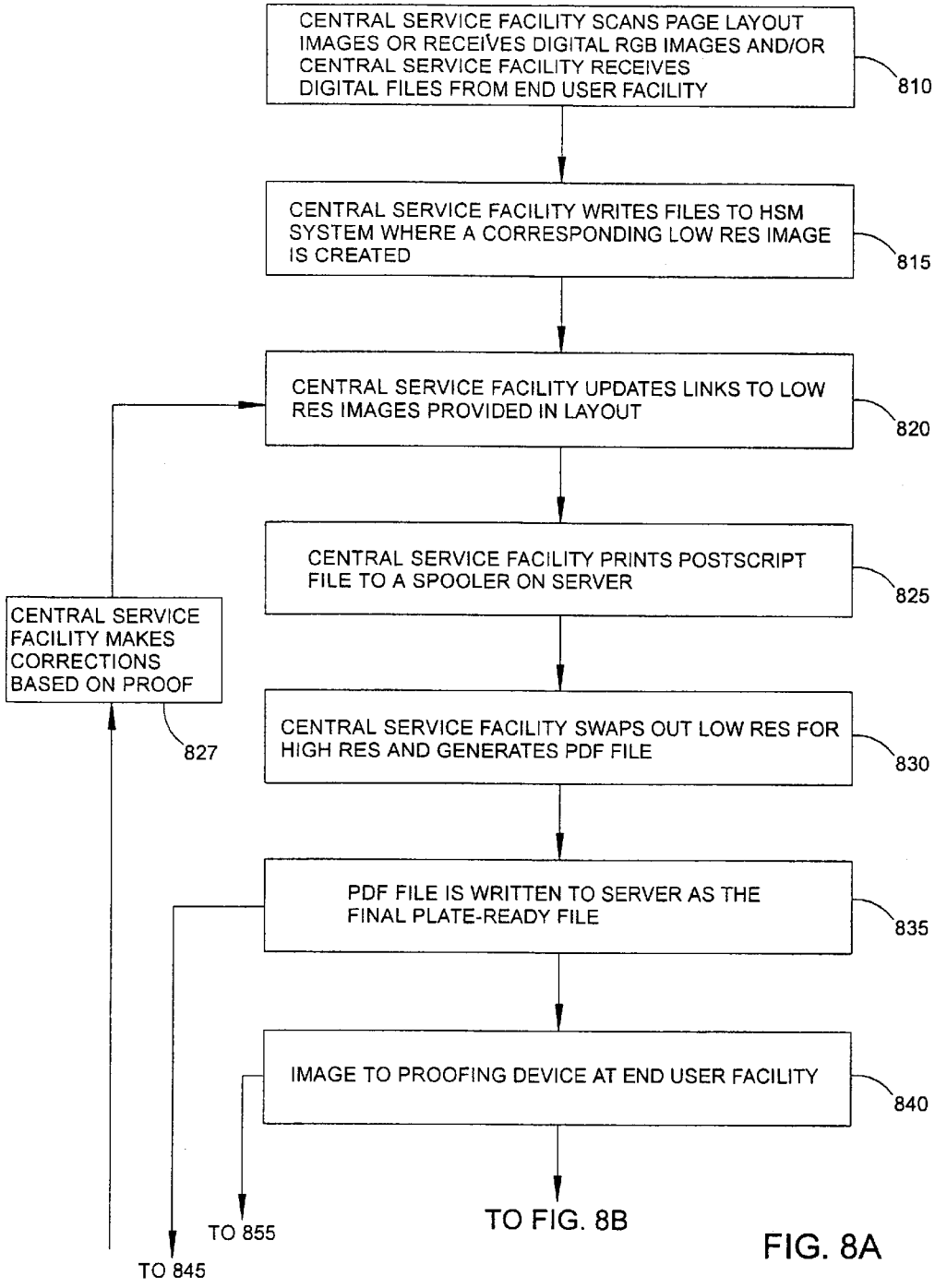

CENTRAL SERVICE FACILITY SCANS PAGE LAYOUT IMAGES OR RECEIVES DIGITAL RGB IMAGES AND/OR CENTRAL SERVICE FACILITY RECEIVES DIGITAL FILES FROM END USER FACILITY
810
CENTRAL SERVICE FACILITY WRITES FILES TO HSM SYSTEM WHERE A CORRESPONDING LOW RES IMAGE IS CREATED
815
CENTRAL SERVICE FACILITY UPDATES LINKS TO LOW RES IMAGES PROVIDED IN LAYOUT
820
CENTRAL SERVICE FACILITY PRINTS POSTSCRIPT FILE TO A SPOOLER ON SERVER
825
CENTRAL SERVICE FACILITY MAKES CORRECTIONS BASED ON PROOF
827
CENTRAL SERVICE FACILITY SWAPS OUT LOW RES FOR HIGH RES AND GENERATES PDF FILE
830
PDF FILE IS WRITTEN TO SERVER AS THE FINAL PLATE-READY FILE
835
IMAGE TO PROOFING DEVICE AT END USER FACILITY
840
TO 855
TO 845
TO FIG. 8B

FIG. 8A

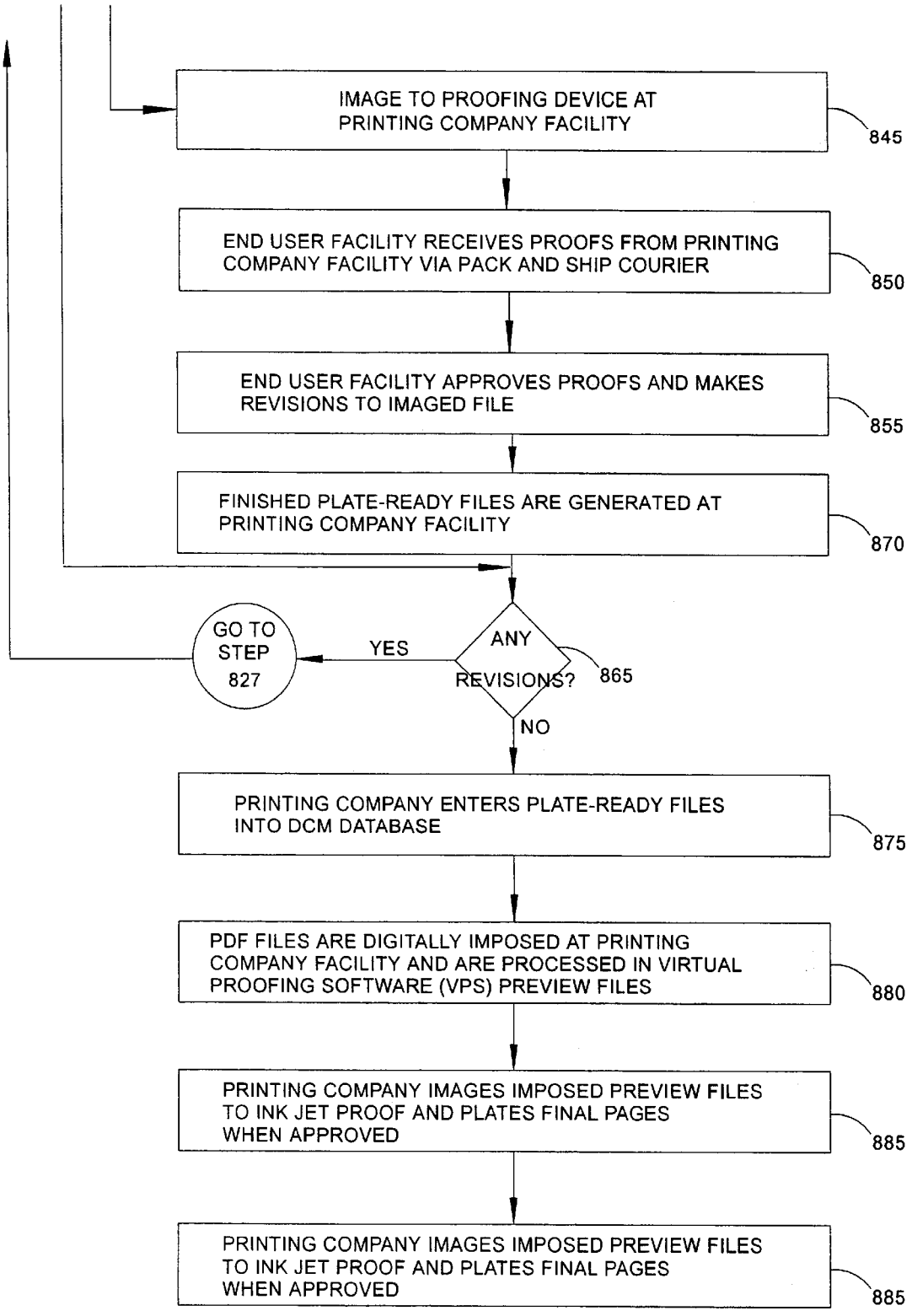


IMAGE TO PROOFING DEVICE AT PRINTING COMPANY FACILITY
845
END USER FACILITY RECEIVES PROOFS FROM PRINTING COMPANY FACILITY VIA PACK AND SHIP COURIER
850
END USER FACILITY APPROVES PROOFS AND MAKES REVISIONS TO IMAGED FILE
855
FINISHED PLATE-READY FILES ARE GENERATED AT PRINTING COMPANY FACILITY
870
ANY REVISIONS?
865
YES
GO TO STEP 827
NO
PRINTING COMPANY ENTERS PLATE-READY FILES INTO DCM DATABASE
875
PDF FILES ARE DIGITALLY IMPOSED AT PRINTING COMPANY FACILITY AND ARE PROCESSED IN VIRTUAL PROOFING SOFTWARE (VPS) PREVIEW FILES
880
PRINTING COMPANY IMAGES IMPOSED PREVIEW FILES TO INK JET PROOF AND PLATES FINAL PAGES WHEN APPROVED
885
PRINTING COMPANY IMAGES IMPOSED PREVIEW FILES TO INK JET PROOF AND PLATES FINAL PAGES WHEN APPROVED
885

FIG. 8B

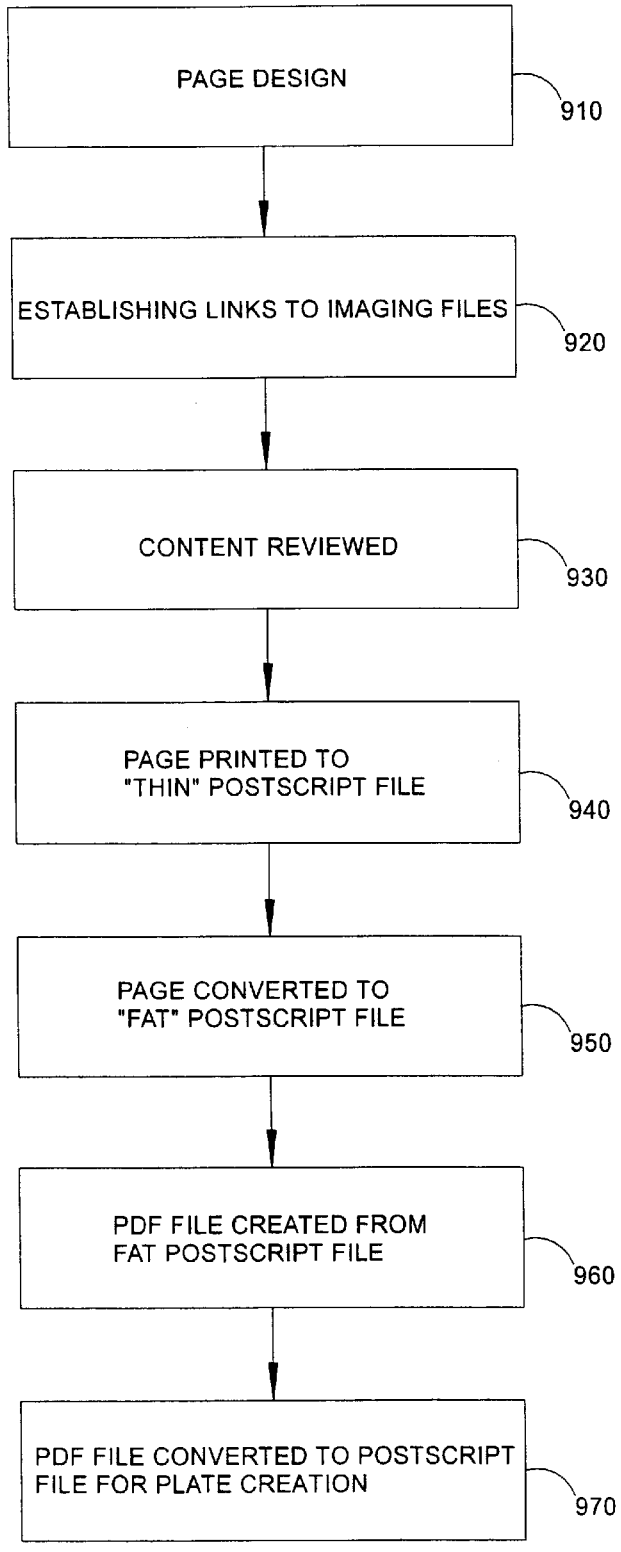

PAGE DESIGN
910
ESTABLISHING LINKS TO IMAGING FILES
920
CONTENT REVIEWED
930
PAGE PRINTED TO "THIN" POSTSCRIPT FILE
940
PAGE CONVERTED TO "FAT" POSTSCRIPT FILE
950
PDF FILE CREATED FROM FAT POSTSCRIPT FILE
960
PDF FILE CONVERTED TO POSTSCRIPT FILE FOR PLATE CREATION
970

FIG. 9

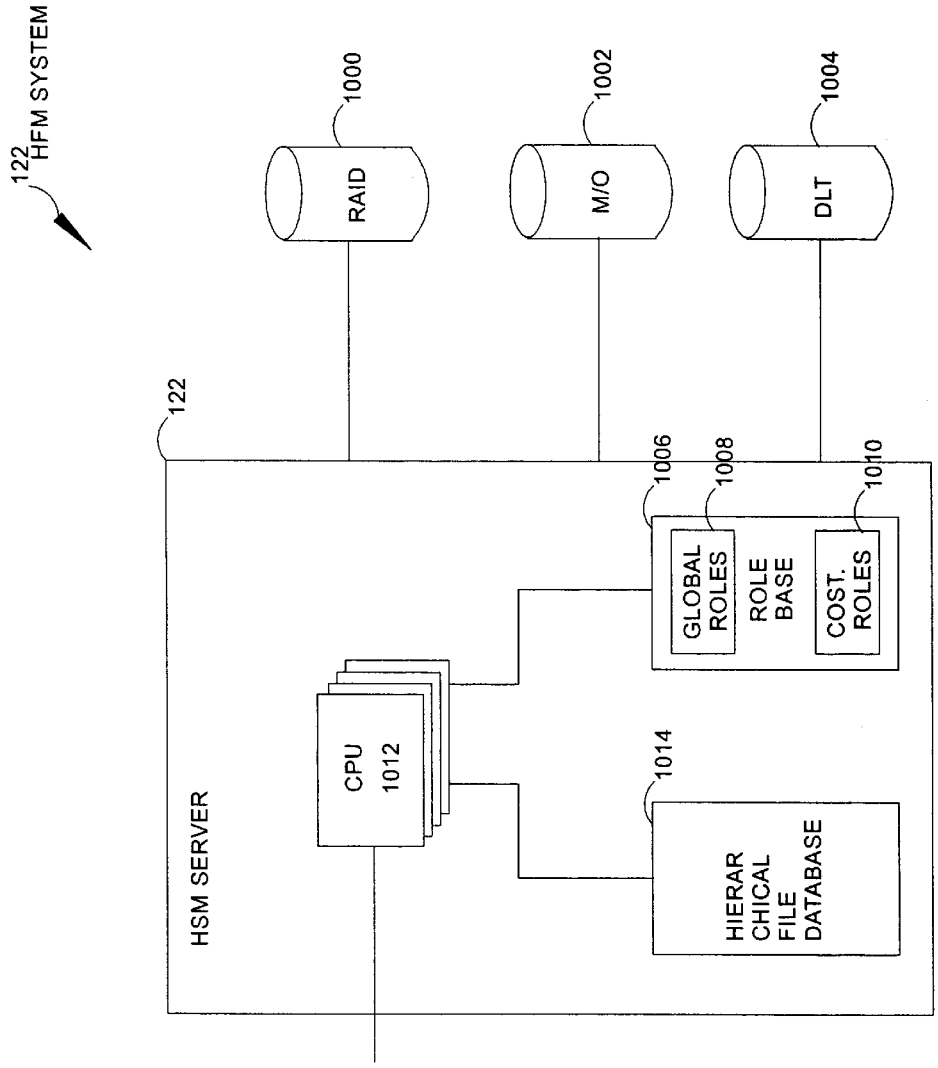

122
HFM SYSTEM
1000
RAID
1002
M/O
1004
DLT
122
1006
1008
1010
GLOBAL ROLES
ROLE BASE
COST. ROLES
CPU
1012
1014
HIERAR CHICAL FILE DATABASE
HSM SERVER

FIG. 10

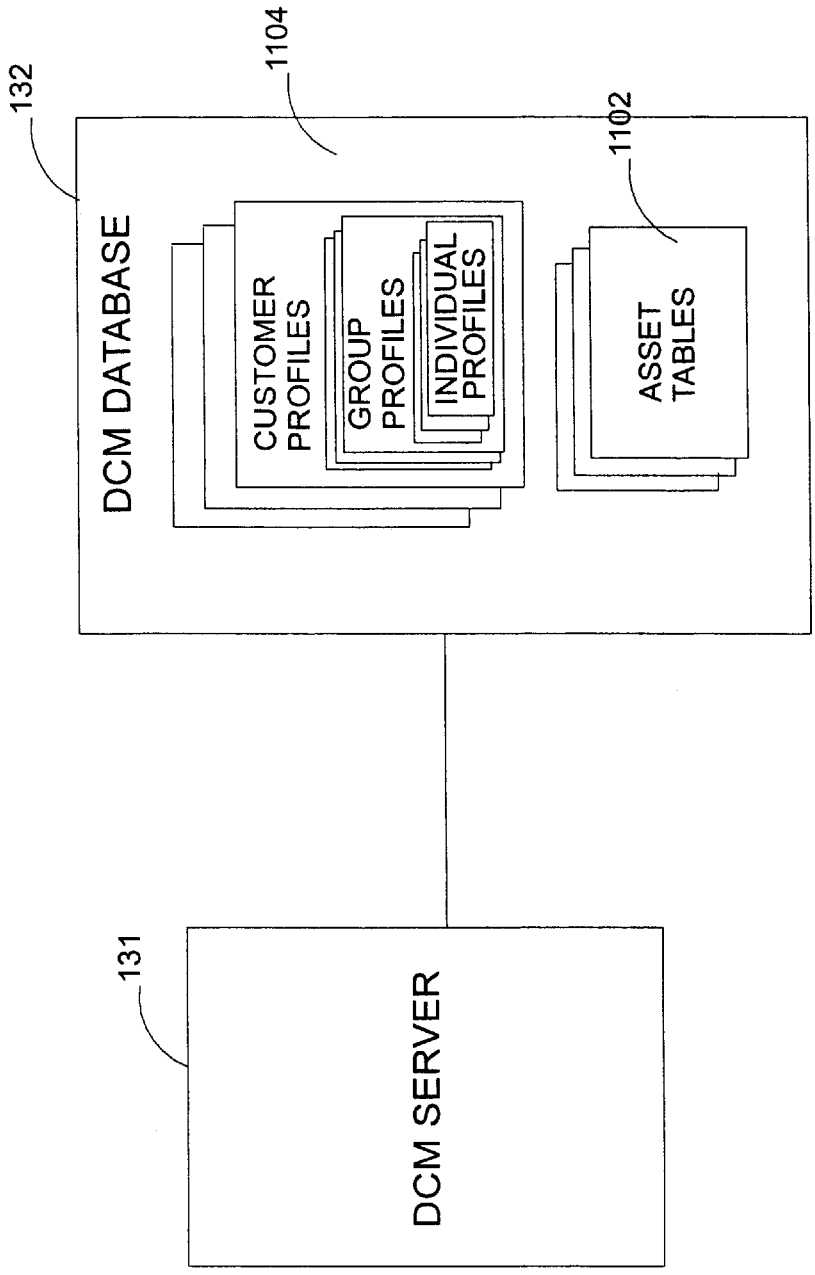

132
1104
1102
DCM DATABASE
CUSTOMER PROFILES
GROUP PROFILES
INDIVIDUAL PROFILES
ASSET TABLES
131
DCM SERVER

FIG. 11

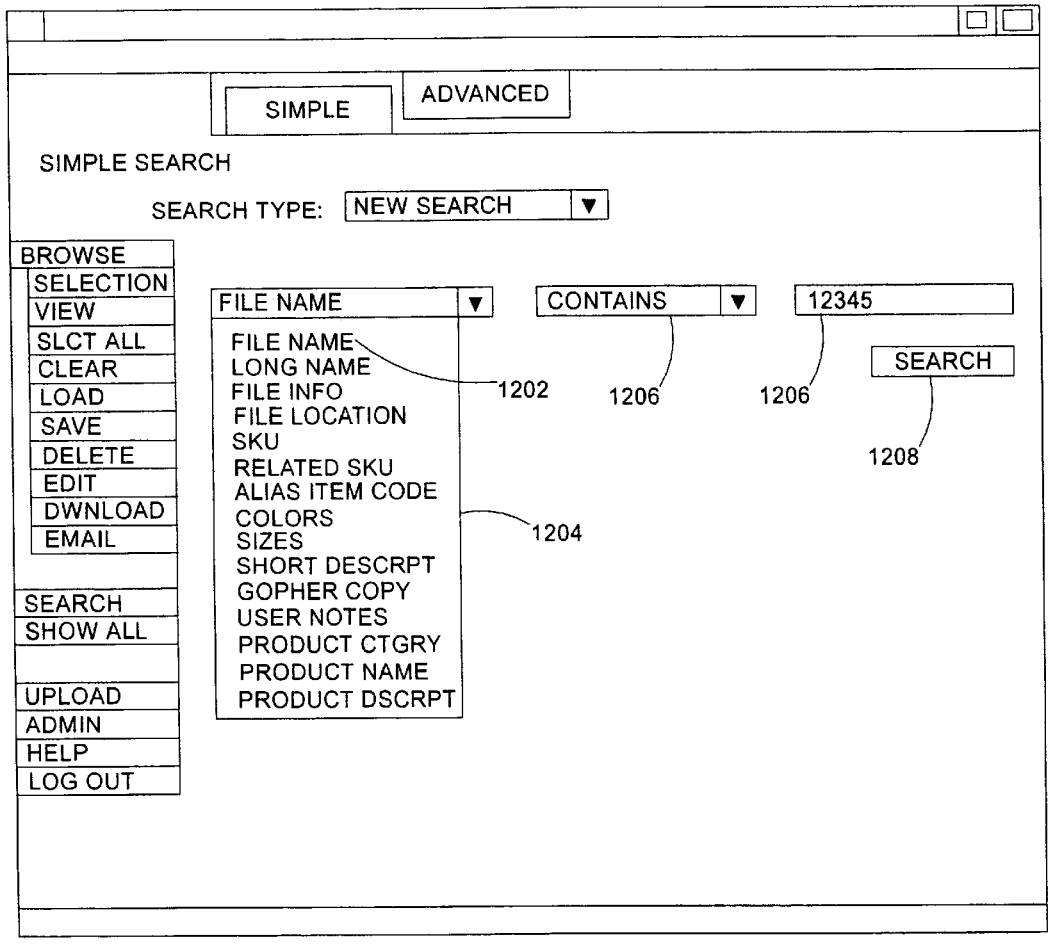

SIMPLE
ADVANCED
SIMPLE SEARCH
SEARCH TYPE:
NEW SEARCH
BROWSE
SELECTION
VIEW
SLCT ALL
CLEAR
LOAD
SAVE
DELETE
EDIT
DWNLOAD
EMAIL
SEARCH
SHOW ALL
UPLOAD
ADMIN
HELP
LOG OUT
FILE NAME
CONTAINS
12345
SEARCH
FILE NAME
LONG NAME
FILE INFO
FILE LOCATION
SKU
RELATED SKU
ALIAS ITEM CODE
COLORS
SIZES
SHORT DESCRPT
GOPHER COPY
USER NOTES
PRODUCT CTGRY
PRODUCT NAME
PRODUCT DSCRPT
1202
1204
1206
1206
1208

FIG. 12

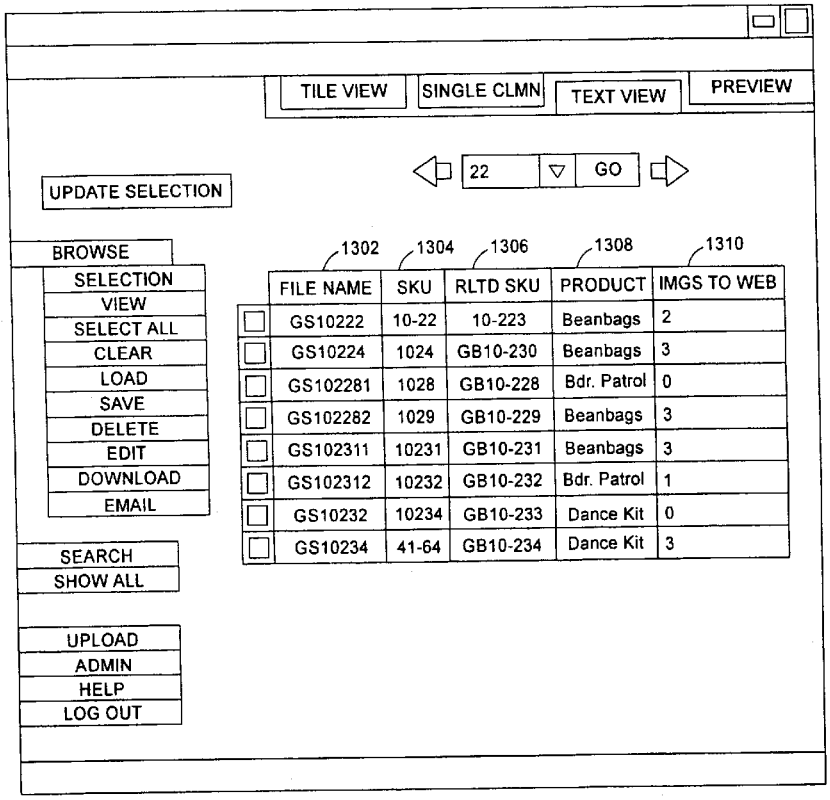

TILE VIEW
SINGLE CLMN
TEXT VIEW
PREVIEW
UPDATE SELECTION
22
GO
BROWSE
SELECTION
VIEW
SELECT ALL
CLEAR
LOAD
SAVE
DELETE
EDIT
DOWNLOAD
EMAIL
SEARCH
SHOW ALL
UPLOAD
ADMIN
HELP
LOG OUT
1302
1304
1306
1308
1310
FILE NAME
SKU
RLTD SKU
PRODUCT
IMGS TO WEB
GS10222 10-22 10-223 Beanbags 2
GS10224 1024 GB10-230 Beanbags 3
GS102281 1028 GB10-228 Bdr. Patrol 0
GS102282 1029 GB10-229 Beanbags 3
GS102311 10231 GB10-231 Beanbags 3
GS102312 10232 GB10-232 Bdr. Patrol 1
GS10232 10234 GB10-233 Dance Kit 0
GS10234 41-64 GB10-234 Dance Kit 3

FIG. 13

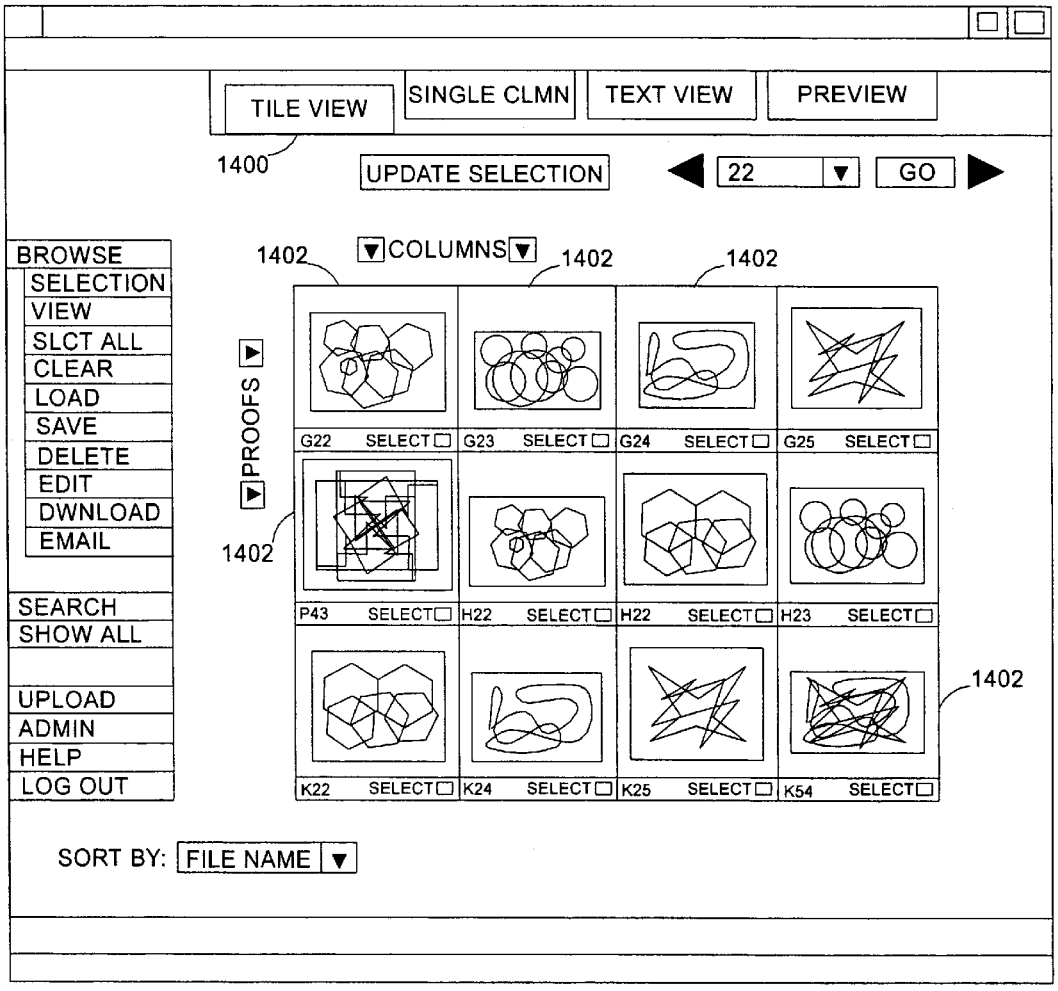

TILE VIEW
SINGLE CLMN
TEXT VIEW
PREVIEW
1400
UPDATE SELECTION
22
GO
BROWSE
SELECTION
VIEW
SLCT ALL
CLEAR
LOAD
SAVE
DELETE
EDIT
DWNLOAD
EMAIL
SEARCH
SHOW ALL
UPLOAD
ADMIN
HELP
LOG OUT
1402
COLUMNS
1402
1402
PROOFS
1402
G22 SELECT
G23 SELECT
G24 SELECT
G25 SELECT
P43 SELECT
H22 SELECT
H22 SELECT
H23 SELECT
K22 SELECT
K24 SELECT
K25 SELECT
K54 SELECT
1402
SORT BY: FILE NAME

FIG. 14

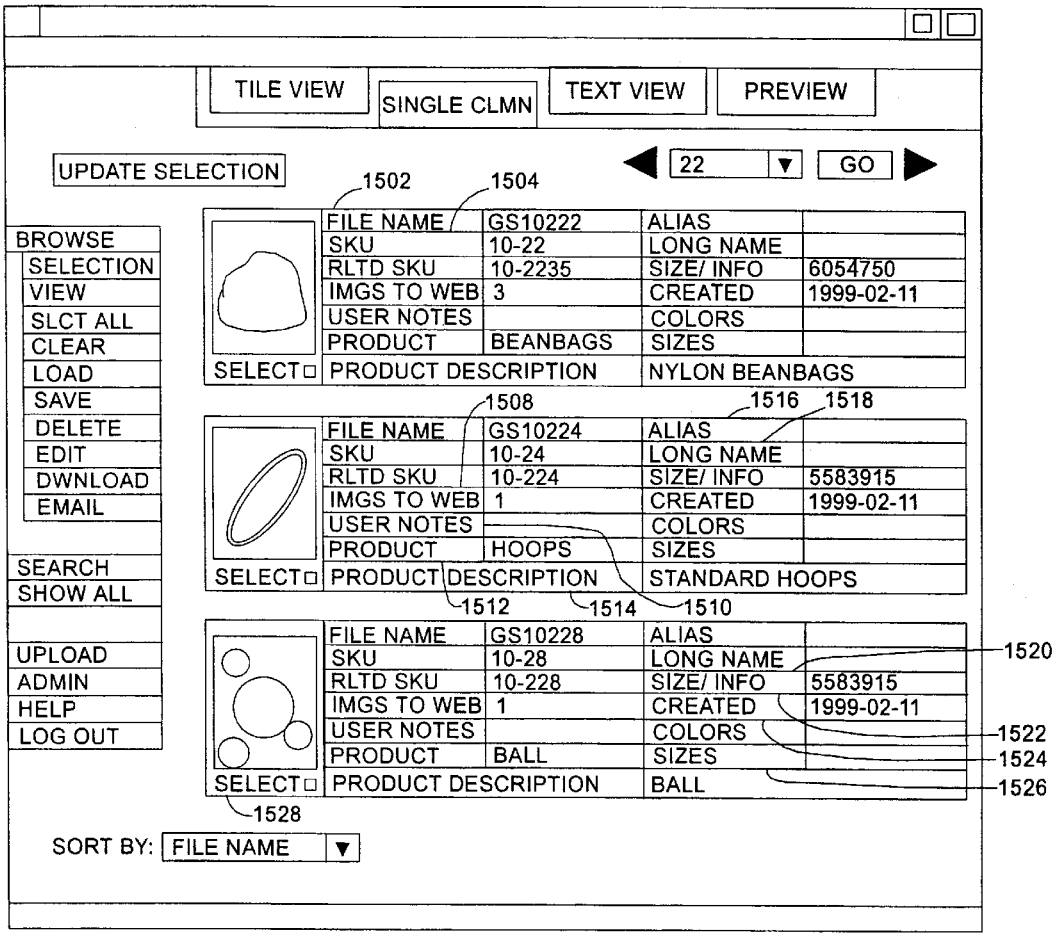

TILE VIEW
SINGLE CLMN
TEXT VIEW
PREVIEW
UPDATE SELECTION
22
GO
1502
1504
BROWSE
SELECTION
VIEW
SLCT ALL
CLEAR
LOAD
SAVE
DELETE
EDIT
DWNLOAD
EMAIL
SEARCH
SHOW ALL
UPLOAD
ADMIN
HELP
LOG OUT
FILE NAME GS10222 ALIAS
SKU 10-22 LONG NAME
RLTD SKU 10-2235 SIZE/ INFO 6054750
IMGS TO WEB 3 CREATED 1999-02-11
USER NOTES COLORS
PRODUCT BEANBAGS SIZES
SELECT PRODUCT DESCRIPTION NYLON BEANBAGS
1508
1516
1518
FILE NAME GS10224 ALIAS
SKU 10-24 LONG NAME
RLTD SKU 10-224 SIZE/ INFO 5583915
IMGS TO WEB 1 CREATED 1999-02-11
USER NOTES COLORS
PRODUCT HOOPS SIZES
SELECT PRODUCT DESCRIPTION STANDARD HOOPS
1512
1514
1510
FILE NAME GS10228 ALIAS
SKU 10-28 LONG NAME
RLTD SKU 10-228 SIZE/ INFO 5583915
IMGS TO WEB 1 CREATED 1999-02-11
USER NOTES COLORS
PRODUCT BALL SIZES
SELECT PRODUCT DESCRIPTION BALL
1520
1522
1524
1526
1528
SORT BY: FILE NAME

FIG. 15

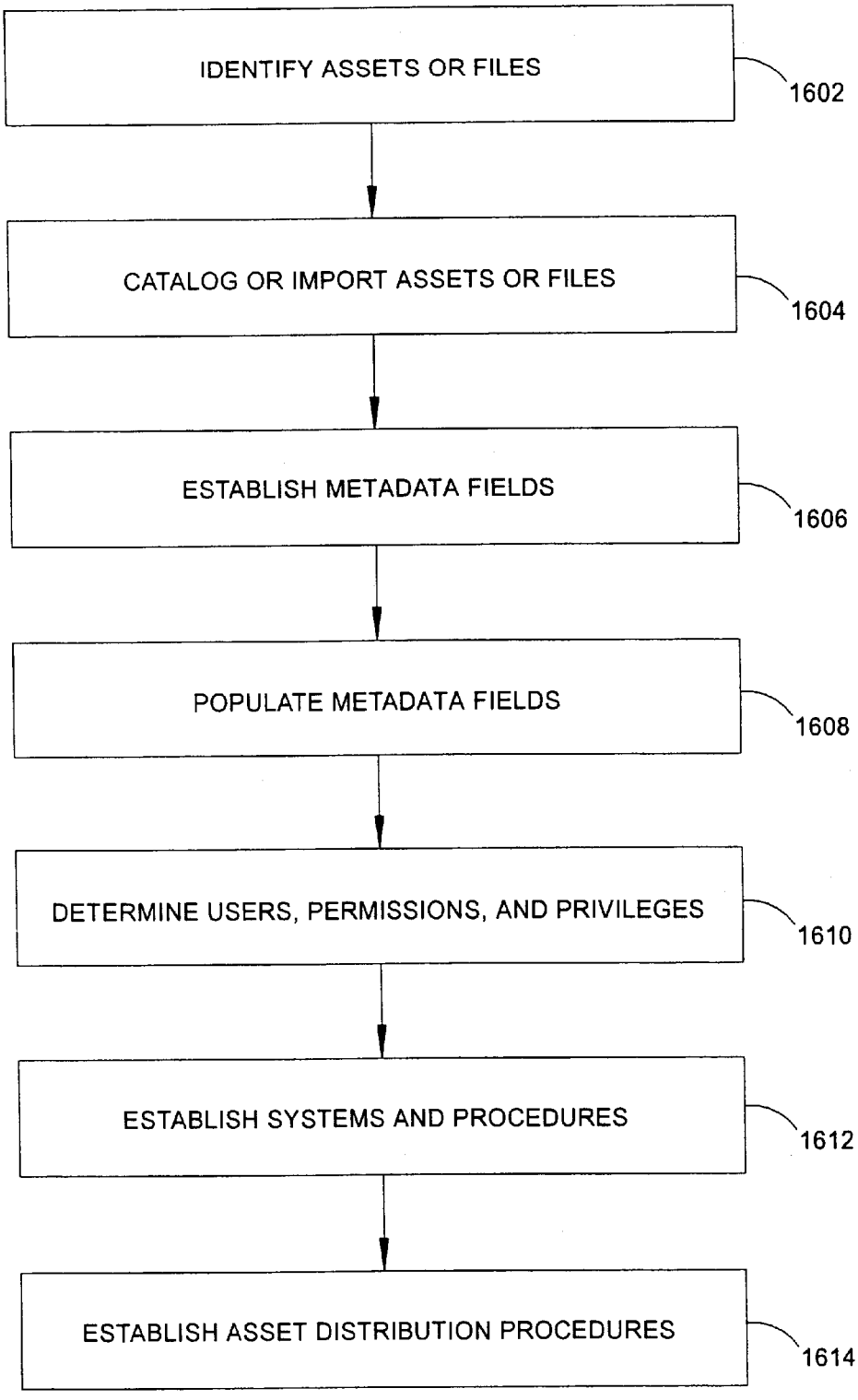

IDENTIFY ASSETS OR FILES
1602
CATALOG OR IMPORT ASSETS OR FILES
1604
ESTABLISH METADATA FIELDS
1606
POPULATE METADATA FIELDS
1608
DETERMINE USERS, PERMISSIONS, AND PRIVILEGES
1610
ESTABLISH SYSTEMS AND PROCEDURES
1612
ESTABLISH ASSET DISTRIBUTION PROCEDURES
1614

FIG. 16

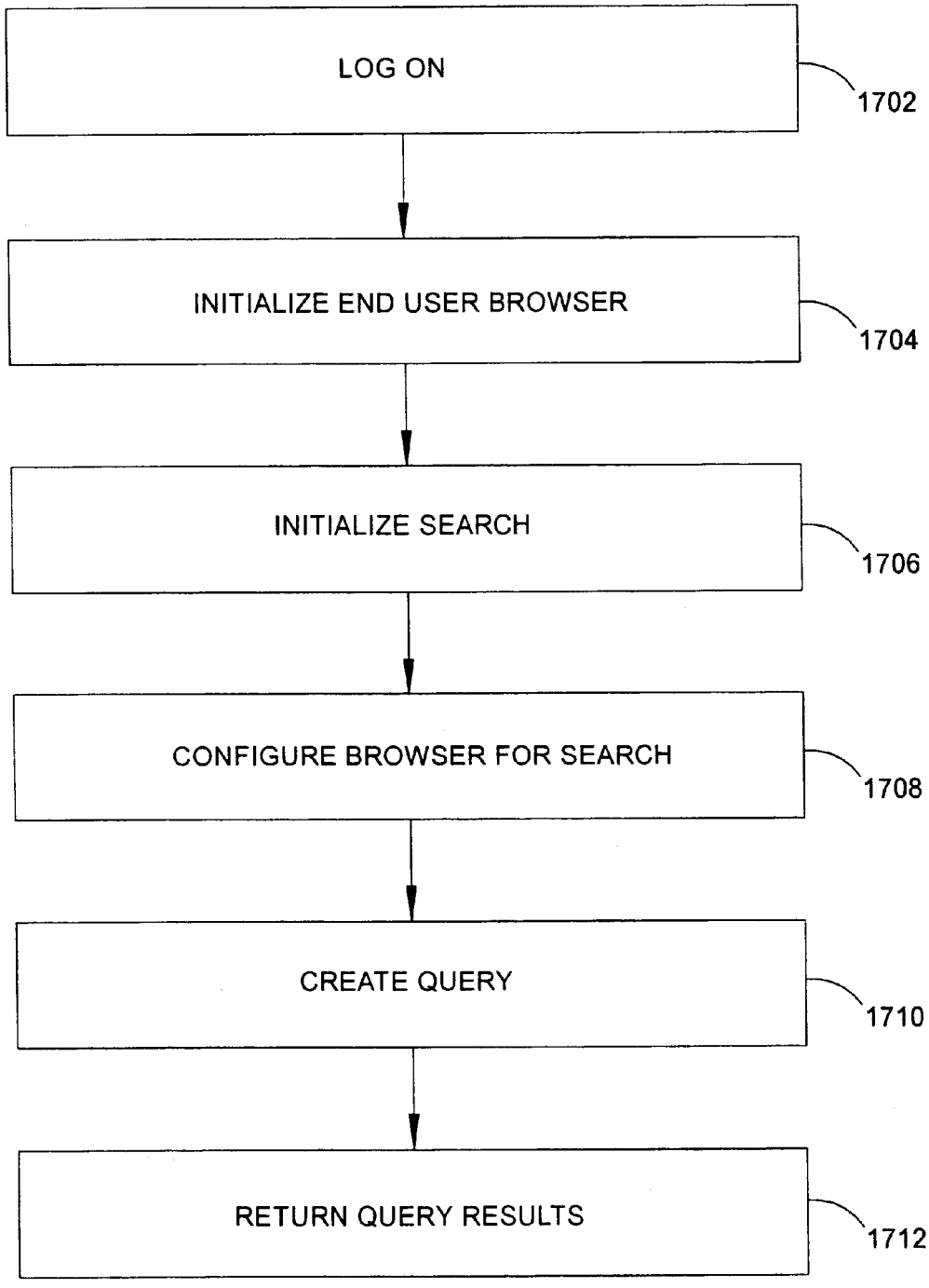

LOG ON
1702
INITIALIZE END USER BROWSER
1704
INITIALIZE SEARCH
1706
CONFIGURE BROWSER FOR SEARCH
1708
CREATE QUERY
1710
RETURN QUERY RESULTS
1712

FIG. 17

SYSTEM AND METHOD OF GENERATING A PRINTING PLATE FILE IN REAL TIME USING A COMMUNICATION NETWORK

FIELD OF THE INVENTION

The present system relates generally to the field of publishing and printing. More particularly, the present invention relates to a system and method of providing publishing and printing services via a communications network.

BACKGROUND OF THE INVENTION

Key steps for producing printed materials using a plate process include (1) preparing copy elements for reproduction, (2) prepress production, (3) platemaking, (4) printing, and (5) binding, finishing and distribution.

In this printing production process, an "end user", such as, publishers, direct marketers, advertising agencies, and corporate communication departments, prepares copy elements for reproduction. In this "design" stage of the printing process, the end user provides images and data using slides or computer files to create one or more "pages". Pages can be designed using computer programs such as QuarkXpress or other publishing software packages. Slides or computer disks containing pages to be printed are sent (via mail or express carrier) to be prepared for creation of a plate.

In the prepress production stage, the end user input (or "copy") is transformed into a medium that is reproducible for printing. Typically, prepress involves typesetting, illustration, page building and design, image capture, image color correction, file conversion, RIPing, trapping, proofing, imposition, filmsetting, and platesetting. "Proofing" involves producing a proof, or sample, of what the printed product will look like. The proof is sent by mail or express carrier to the end user for review and approval. After alterations are made, new proofs are sent to the end user. Once approval of the proof is given by the end user, a medium, such as a computer to plate (CTP) file is produced and sent to the printer. "Imposition " involves the set of pages on a particular plate as well as their positioning and orientation. Imposition is particularly important in the creation of booklets or catalogs, where pages are positioned using register marks to assist in the stripping, collating, and folding of the printed product.

In the platemaking stage, a "printer" manufactures a printing plate using the medium created during prepress. Where a CTP file is used, the printer converts the CTP file into a printing plate or goes directly to a digital press. In the printing stage, the printer uses the printing plate to create the printed product. In the binding, finishing and distribution stage, the printed product is prepared in its final form.

Each step in the printing production process described briefly above can be accomplished using a variety of different known systems and techniques. Nevertheless, such conventional systems have many delays, particularly in the transporting of pages and proofs to and from the end user and prepress provider. Due to delays and the fragmented nature of conventional printing production systems, errors often occur. Further, typical printing production systems are limited in their ability to re-purpose data, manage content of pages, and piece together individual processes or tasks to establish an efficient production system or "workflow". Indeed, no conventional system combines prepress, content management, infrastructure (server, storage & distribution) and workflow services.

Conventional printing and publishing systems generally include Macintosh computers or workstations which communicate with each other using the AppleTalk protocol. AppleTalk protocol cannot however be communicated over switched networks such as the Internet and private networks where nodes in the network have IP (Internet Protocol) addresses. As such, conventional systems cannot merely be coupled to a communication network for remotely controlling design, prepress and print processes.

There is a need for a system which combines design, prepress, content management, infrastructure (server, storage & distribution) and workflow. For end users in particular, there is a need for a system and a method to gain control of the design, prepress, and print processes. To save time and costs, there is a need to eliminate manual shipping of proofs back and forth to a prepress provider. Further, there is a need for a prepress capability at a local facility without the time and costs of shipping proofs back and forth to a prepress provider. Even further, there is a need for a system and method to provide plate-ready files over a communications network for delivery to a CTP device. Moreover, for commercial printers, there is a need for a system and method to remotely drive a plate-setting device located at a printer's facility. Further, there is a need to decrease the amount of time necessary to generate printing plates after processing of the pages (i.e., the cycle time). Even further, there is a need for providing access to the functionality of high-end server, storage, and networking equipment to the printer facility without the associated capital investments.

SUMMARY OF THE INVENTION

The present invention provides a solution for communicating and managing printing and publishing services. The technique is preferably implemented in a system architecture which allows remote printing and publishing services in real time. System components are installed at an end user facility, a printing company facility, and a central service facility. These components may include hardware, firmware, and software components which facilitate the exchange, management, and adaptation of data for the printing and publishing services provided.

In a preferred configuration, software included in the system architecture facilitates creation of pages at the end user facility and final printing of the created pages at a printing company facility. Digital files, including graphics, images, text, and art used in the creation of these pages, are stored at the central service facility and are accessible at the end user facility. Management software facilitates the management and organization of data files throughout the system. The technique may also facilitate the integration of other services into the system.

One embodiment of the invention relates to a printing and publishing system which generates a printing plate-ready file from data provided remotely in real time using a communication network. The printing and publishing system includes a central service facility and an end user facility and/or a printing company facility. The end user facility provides page building operations allowing the design and construction of pages from images, text, and data available via said communication network. The central service facility provides storage, file processing, remote access, and content management operations. File processing operations include generating a plate-ready file from pages designed at said end user facility. The plate-ready file has a file format capable of high resolution and is ready for creation of a printing plate. The printing company facility provides printing operations for producing a printing plate from said plate-ready file.

Another embodiment of the invention relates to a method of generating a plate-ready file configured for the creation of

a printing plate, said plate-ready file being associated with page layouts and being provided in real time from a remote location using a communication network. The method includes remotely providing access to imaging files for searching and retrieving images used in the design of a page layout by a remote user; establishing links to said imaging files, thereby creating a thin Postscript file from the page layout design by the remote user; parsing said thin Postscript file to extract data associated with low resolution images and replace with high resolution data, thereby forming a fat Postscript file; creating a portable document format (PDF) file from said fat Postscript file; and converting said PDF file to a file in plate-ready format.

Another embodiment of the invention relates to a method of generating a plate-ready file configured for the creation of a printing plate, said plate-ready file being associated with page layouts and being provided in real time from a remote location using a communication network. The method includes storing high resolution files on a computer server, generating low resolution files corresponding to said high resolution files, providing said low resolution file to a remote client so that the designing of the page layout via a communication network, generating a plate-ready file from the page layout design by said remote client, and providing said plate-ready file to a remote printer.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a diagrammatical representation of a series of printing and publishing systems coupled together via a communication network for providing prepress, content management, infrastructure, and workflow within one interconnected printing and publishing system;

FIG. **2** is a block diagram of the printing and publishing system shown in FIG. **1**, illustrating certain functional components of an exemplary embodiment of the end user facility and the central service facility;

FIG. **3** is a block diagram of the printing and publishing system shown in FIG. **1**, illustrating certain functional components of a second exemplary embodiment of the end user facility and the central service facility;

FIG. **4** is a block diagram of the printing and publishing system shown in FIG. **1**, illustrating certain functional components of an exemplary embodiment of the printing company facility and the central service facility;

FIG. **5** is a block diagram of the printing and publishing system shown in FIG. **1**, illustrating certain operational components of an exemplary embodiment of the end user facility, the printing company facility, and the central service facility;

FIG. **6** is a flow chart illustrating an exemplary process of the printing and publishing system shown in FIG. **1**, where prepress operations are performed at the end user facility;

FIGS. **7**A and **7**B are a flow chart illustrating an exemplary process of the printing and publishing system shown in FIG. **1**, where prepress operations are performed at the printing company facility;

FIGS. **8**A and **8**B are a flow chart illustrating a second exemplary process of the printing and publishing system shown in FIG. **1**, where prepress operations are performed at the central service facility;

FIG. **9** is a flow chart illustrating an exemplary production workflow of the printing and publishing system shown in FIG. **1**;

FIG. **10** is a block diagram of the hierarchical storage management system (HSM) of the central service facility of FIG. **3**;

FIG. **11** is a block diagram of the digital content management (DCM) system of the central service facility of FIG. **1**;

FIG. **12** is an interface page for selecting one or more attributes used for conducting a search of the DCM system of FIG. **11**;

FIG. **13** is an interface page for displaying search results to the end user after an exemplary search of the DCM system of FIG. **11** is conducted;

FIG. **14** is an interface page for displaying a "tile" view of search results identified by attributes in the search of the DCM system of FIG. **11**, including a thumbnail representation of the graphics file identified by the search;

FIG. **15** is an interface page of a search result after an exemplary search of the DCM system of FIG. **11**, including metadata and a thumbnail representation of the associated graphics file;

FIG. **16** illustrates the process of creating and populating the DCM content management system; and

FIG. **17** illustrates a method of connecting to the central service facility, and searching for files on the DCM.

DETAILED DESCRIPTION OF THE DRAWINGS

Turning now to the appended drawings, and referring first to FIG. **1**, a printing and publishing system **100** is illustrated which integrates prepress, content management, infrastructure, and workflow processes into one real time system. Printing and publishing system **100** includes a central service facility **105**, an end user facility **300**, and a printing company facility **400**, all of which are interconnected via a private network **160** or a public network **190**.

System **100** preferably includes a communication routing device **200**, such as, routers and switches. Communication routing devices are included at central service facility **105**, end user facility **300**, and printing company facility **400**. Routers include multiple interfaces to handle the variety of network connections in system **100**. Routers and switches provide for internet and extranet connections. In general, switches switch traffic using ATM cells and Ethernet frames. Routers route TCP/IP data packets between the different IP networks. Routers are commercially available components, such as, the **3**Com Netbuilder II and CISCO **7500**.

Communication routing device **200** includes an internal firewall which authenticates data traffic incoming from private network **160** or public network **190**. In the exemplary embodiment, communication routing device **200** directs data traffic utilizing the Transmission Control Protocol/Internet Protocol (TCP/IP) communication scheme. In alternative embodiments, communication routing device **200** communicates using any of a variety of communication protocols.

While communication routing device **200** includes a firewall capability, printing and publishing system **100** can also include a separate firewall **170**. Firewall **170** is a security barrier which stops all data traffic incoming from public network **190** and checks conditions and authentication of the data traffic for security purposes.

Private network **160** is a network of subscribers to printing and publishing system **100** with communication links to central service facility **105**. Private network **160** is an asynchronous transfer mode (ATM) network, a synchronous optical network (SONET), or any packet or cell switched network. In the exemplary embodiment, communication links to network **160** include DS3 lines, T-1 lines, Bonded T1 lines, and any other dedicated network connection. Considerations for the type of network connection used are

related to data capacity or speed. DS3 lines, for example, provide for an operational speed of 44.736 MBps. Alternatively, OC3, OC12, or any other communication lines can be coupled to local network **150** to provide high speed dedicated network connections. Other communication connections to local network **150** can include ISDN lines. ISDN lines provide between 128 k to 1.544 MBps data capacity or speed.

Public network **190** is a network of subscribers and non-subscribers to printing and publishing system **100**. In an exemplary embodiment, public network **190** is the Internet. Public network **160** is connected to central service facility **105** via a firewall **170**. Subscribers to printing and publishing system **100** in external network **190** are allowed access to a cached copy of their archived files via firewall **170**. In the exemplary embodiment, firewall **170** is the commercially available Checkpoint Firewall-1. Subscribers to network **190** can also have a firewall at end user facility **300** or printing company facility **400** for data traffic incoming from public network **190**.

Data may be exchanged between central service facility **105** and either private network **160** or public network **190** in any suitable format, such as in accordance with the Internet Protocol (IP), the Transmission Control Protocol (TCP), or other known protocols. Moreover, certain of the data may be transmitted or formatted via markup languages such as the HyperText Markup Language (HTML), or other standard languages.

Printing and publishing system **100** can also include an offsite storage facility **180** coupled to central service facility **105**. Offsite storage facility **180** provides a remote archival system for disaster contingency purposes. Offsite storage facility **180** preferably includes digital linear tape (DLT) which secures storage of files also stored at central service facility **105**. Offsite storage facility **180** is preferably connected via a minimum of a DS3 communication connection. In the exemplary embodiment, backups of files are created at offsite storage facility **180** within minutes of creation at central service facility **105**.

In the exemplary embodiment, central service facility **105** includes a server **110**, a hierarchical storage management (HSM) system **120**, a digital content management (DCM) system **130**, a network access device (NAD) **140**, a local network **150**, and firewall **170**. Alternatively, system components located at central service facility **105** can be installed at end user facility **300** or printing company facility **400**. For example, while the exemplary embodiment illustrates DCM system **130** at central service facility **105**, with access at end user facility **300**.

Server **110** is a computer server, such as, the commercially-available Sun Microsystems E6500 Enterprise server. Server **110** includes multiple input/output (I/O) boards and runs a software application, such as FullPress, commercially-available from Xinet. Server **110** also includes redundant and hotswappable hardware, allowing failed equipment to be replaced without interruption. That is, replacement can be accomplished without turning power off. While the exemplary embodiment includes a particular computer server and software, server **110** is alternatively any scalable, enterprise computer server and can run any of a variety of application programs. For example, while server **110** preferably operates using FullPress software, any open prepress interface (OPI) software can be used. OPI software provides Macintosh desktop computers or other types of computers which are connected to remote network **160** with access to server **110**. OPI software also swaps low resolution files to larger high resolution files. Other types of OPI software include IPT and Helios, both of which are available commercially.

In general, HSM system **120** provides multi-tiered storage and automatic archiving and backup of electronic files communicated across private network **160** or public network **190**. In one embodiment, HSM system **120** includes redundant arrays of inexpensive disks (RAID) fiber channel storage, which is highly scaleable and storage area network (SAN) capable. In this embodiment, HSM system **120** includes a capacity of greater than a Terabyte of RAID storage. Advantageously, the speed and high capacity of the RAID storage in HSM system **120** provides for storage and retrieval of high resolution images and other large files.

In the exemplary embodiment, HSM system **120** also includes a magneto-optical jukebox and digital linear tape (DLT), which provide additional storage capacity. Both are commercially available. The magneto-optical jukebox and the DLT provide redundancy of files stored in RAID storage. That is, electronic files stored in RAID storage are copied into the magneto-optical jukebox and DLT. Such redundancy provides for a low risk of lost files. The DLT has slower access speed in comparison to other storage structures in the exemplary embodiment of HSM system **120**. HSM system **120** is illustrated and described in greater detail with reference to FIGS. **3** and **10**.

Digital content management (DCM) system **130** includes a computer server **131** running software which manages the digital files communicated to and from local network **150**. In the exemplary embodiment, DCM system **130** includes two Sun MicroSystem Solaris servers: an Ultra2 and a Sparc 1000. DCM system **130** provides multi processing, multi-user access, high input/output capabilities, security, and stability. In an alternative embodiment, DCM system **130** employs server **110** as one main server. In the exemplary embodiment, DCM server **131** is separate from the main server and enables additional testing, maintenance, and upgrades without affecting mission critical production requirements. DCM server **131** operates using a variety of image and database management software tools, including Oracle, Telescope, FullPress, Web Native, and Java.

DCM server **131** preferably utilizes the operating system known as Solaris, a widely-used version of the UNIX operating system. In alternative embodiments, DCM server **131** operates using a Microsoft NT server. DCM system **130** is coupled to a database **132** and utilizes graphic engine software, such as, Telescope. DCM system **130** is utilized to perform content management operations as described herein and in particular with reference to FIG. **11**. Content management operations also require use of HSM system **120**, described herein with reference to FIG. **10** in particular. Content management operations, such as, search, select, place, and save provide for the page design and platemaking of printing and publishing system **100**.

Network access device (NAD) **140** is a device which couples local network **150** to an external private network, such as, private network **160**. In one embodiment, NAD **140** connects local network **150** with a private network called WAM!NET™. WAM!NET is a private communication network which offers connectivity of databases for content management as well as proofing devices for proofing a file. WAM!NET connects printing companies to advertising agencies, publishers, and graphic design firms. Nevertheless, document delivery by WAM!NET is not done in real time.

NAD **140** includes a communication router, a channel service unit/data service unit (CSU/DSU), a UNIX server, an

interruptible power supply, a disk storage subsystem, and a high-speed asynchronous modem. WAM!NET communicates using TCP/IP and AppleTalk protocols.

Local network **150** is preferably a local area network (LAN) including a combination of fast Ethernet and ATM OC3 ports which utilize campus ATM switches. Alternatively, local network is any kind of communication network capable of connectivity to the foregoing system components including Gigabit Ethernet.

The foregoing system components at the central service facility **105** are by way of illustration only. Other components can be included or substituted at central service facility **105**. Such additional components can enhance the functionality and operability of printing and publishing system **100**.

FIG. **2** is a block diagram illustrating a functional view of the system components at central service facility **105** and end user facility **300** in an exemplary embodiment. As shown in FIG. **2**, end user facility **300** includes a router **310**, a desktop computer **320**, a digital color proofer **330**, and a black and white laser printer **340**. End user facility **300** stores files in HSM system **120** at central service facility **105**. Thus, end user facility **300** has the advantage of reducing local storage needs while increasing overall capabilities to organize and maintain high volumes of data. Further, connectivity to central service facility **105** reduces the investment needed in storage capacity at end user facility **300** while allowing the end user on-line access to data via telecommunication connections.

Router **310** connects end user facility **300** to private network **160** and central service facility **105** using a variety of different protocol communication schemes. As indicated previously, routers are communication routing devices and can be replaced with switches, depending on the network connected to end user facility **310**. Desktop computer **320** can be any of a variety of computer machines, such as, Macintosh computers or personal computers (PCs). Desktop computer **320** runs a variety of computer programs, such as, QuarkXpress or other page designing programs. Desktop computer **320** provides for page building operations such as editing or placement of images and data provided via network **160**. FPO ("for position only") images or low resolution images, are downloaded via private network **160** from HSM system **120** at central service facility **105**. Links are established from the low resolution images to the corresponding high resolution files stored on HSM system **120**. Such links provide for open prepress interface (OPI) processes. As described herein, OPI processes allow low resolution files to be quickly communicated and manipulated in the page building process. Low resolution images are replaced by high resolution files before contract proofs are created.

Digital color proofer **330** and black and white laser printer **340** are printing devices which provide printed copies, samples, or proofs from files output from desktop computer **320**. Advantageously, digital color proofer **330** is a 4-color machine, making quality color break visible upon inspection. Printer **340** includes an onboard raster images processor (RIP) to rasterize files. Proofer **330** has a separate RIP. "Rasterize" is the conversion of data to a bitmap. A bitmap is a digitized collection of binary pixel information that gives an output device, such as, printer **340** or proofer **330**, the ability to image data to paper, film, or plate. End user facility **300** can use any of a variety of proofers or printers, including a variety of software to interface with the proofer or printer.

The foregoing system components at end user facility **300** are by way of illustration only. Other components can be included or substituted at end user facility **300**. Such additional components may enhance the functionality and operability of printing and publishing system **100**.

FIG. **3** is a block diagram illustrating a functional view of the system components at central service facility **105** and end user facility **300** in a second exemplary embodiment. In this alternative configuration, end user facility **300** includes a hub device **315**, digital desktop workstation **350**, and AppleTalk network desktop workstation **360**. End user facility **300** receives communications from central service facility **105** via a point to point communication connection (T1 to DS3) which is coupled to router **310** at end user facility **300**.

At central service facility **105**, router **200** communicates with a hub **215** which couples server **110**, HSM system **120**, and DCM system **130**. In the embodiment illustrated in FIG. **3**, server **110** includes a server device **112** and a storage device **114**. Further, HSM system **120** includes a server device **122** and a storage device **124**. HSM system **120** is described in greater detail with reference to FIG. **10**. DCM system **130** includes a database server device **132** and a database **134**. These system components are by way of example only and provide for the operational components of the system as described herein. Other components can be included at either central service facility **105** or end user facility **300**.

FIG. **4** is a block diagram illustrating a functional view of the system components at central service facility **105** and printing company facility **400** in an exemplary embodiment. Printing company facility **400** includes a router **410**, a hub **415**, a server **420**, a desktop computer **430**, a laser printer **440**, a color plotter **450** and a platesetter **460**. Hub **415** coordinates communication to and from server **420**, desktop **430**, laser printer **440**, color plotter **450**, plate-setter **460**, and router **410**. Server **420** operates using software which includes programs to rasterize files in preparation for creation of plates.

Desktop computer **430** is any of a variety of different computer stations, including commercially available Macintosh computers (MACs) or personal computers (PC) as well as dedicated workstations. Laser printer **440** is also commercially available, such as the digital Dylux laser printer. Color plotter **450** provides color samples, proofs, or printed output versus the black and white output from laser printer **440**.

Platesetter **460** provides digital plate production. In the exemplary embodiment, platesetter **460** can image thermal plates up to a resolution of 3,200 dpi with a capacity of 200 plates a day. Platesetter **460** requires a customized front-end RIP to drive imaging. RIP software is included in server **420**.

Printing company facility **400** receives the digital information via a communications connection coupled to a router **200** and network **150**. Network **150** is coupled to server **110** and HSM system **120**. Network **150** may include a hub, such as, hub **215** (FIG. **3**). In the embodiment illustrated in FIG. **4**, HSM system **120** includes a variety of different storage devices **125**. Network **150** is also coupled to a commercial network **162**, such as, WAM!NET, or a public network, such as, the Internet.

In the presently preferred embodiment, the foregoing functional components illustrated in FIGS. **1–4** may be configured as hardware, firmware, or software on any appropriate computer platform. The functional components of each facility may include additional personal computers or workstations, in addition to a main frame computer in which one or more of the servers, the routers, and so forth, are

configured. It also should be noted that the foregoing functional components may be adapted in a variety of manners for executing the functions described herein. In general, the functional components facilitate the printing and publishing services provided at a end user facility and a printing company facility, which is preferably implemented in a real time manner to provide increased response time to all of the printing and publishing services.

FIG. **5** illustrates certain operational components of an exemplary embodiment of end user facility **300**, printing company facility **400**, and central service facility **105** in printing and publishing system **100**. The operational components include processes or tasks which are pieced together to establish an efficient printing and publishing production system. Operational components are shown in FIG. **5** and discussed herein with respect to a particular facility; however, operations are not limited to being performed by a particular facility. For example, prepress operations can be performed by central service facility **105** or printing company facility **400**.

Exemplary operational components carried out by end user facility **300** include page building and high resolution proofing. Page building includes the assembly of page elements, such as, text and art to create a page. High resolution proofing includes the review of a sample, printer proof of the page. A proofing device, such as, digital color proofer **330** or laser printer **340** (FIG. **2**), are examples of system components used to output the sample. A proof or sample is different than an actual print in that an actual print is normally printed via a large-format press and a proof is output from small proofing devices. In the case of a proof, the image data is transferred directly to paper. In the case of an actual print, there are intermediate stages between the imaging of data and its transfer to paper. Once the sample or proof is printed, it is reviewed to check for content accuracy and color quality.

Exemplary operational components carried out by the printing company facility **400** include production management, equipment operation, digital plate-making, desktop imposition, high resolution digital proofing, inkjet plotting, black and white laser printing, platemaking, and press.

Equipment operations are performed by trained individuals that operate equipment or perform functions necessary to complete a project at various stages of the production cycle. Black and White laser proofing is used to verify the content of an individual page or image. High resolution digital proofing provides a color reproduction of data that is contained in a digital file to verify that its content and color is accurate. Desktop imposition enables digital positioning of pages into a layout that facilitates the output of a printed product to a pre-specified layout or sequence, which is dictated by the equipment that will be used to produce the product. Inkjet plotting is used to output a large format proof to verify the placement of digital pages in an imposition that will represent what will be imaged to a printing page. Digital platesetting interprets and images digital data onto a printing plate that is used as the medium to transfer ink to paper on a printing press. Press includes any of a variety of plate printing processes, such as, offset, flexo, and gravure.

Exemplary operational components carried out by the central service facility **105** include customer service, technical support, proofreading, trapping, file processing, film scanning, remote customer access, color correction, backup, data storage, OPI operations, content management, disaster recovery and training.

Trapping involves an overlap or underlap between colors that butt against each other to compensate for misregistration during printing. Typical machines and programs used to perform trapping include Art Work Systems' Art Pro, Scitex Systems' Full Auto Frames, and page building programs such as QuarkXpress or Adobe Illustrator.

File processing includes gathering linked data and supporting art and fonts into a single file that is stable, predictable, and ready to image to proof or plate. The machines and/or programs used to conduct file processing include the application used to build a page, such as, QuarkXpress, InDesign by Adobe Systems and the software programs used to generate stable, predictable, plate-ready files. Such software programs include Adobe Acrobat Distiller, Art Work System and Scitex Brisque.

Color correction includes manipulation of a digital file to more accurately represent the printed form to the original. Machines or programs used for color correction include programs such as Adobe PhotoShop.

Backup includes using HSM system **120** (FIG. **1**) to copy files immediately to different media types. Redundancy of copies on multiple storage median in HSM system **120** provides for appropriate backups. Backup techniques and program are selected based on ease of use, scalability, and reliability.

Data storage includes storage of files saved at end user structure **300** in HSM system **120**. In particular, when an operator at desktop computer **320** saves as file, the file is automatically saved via network **160** at HSM system **120**.

File processing includes performing OPI operations. OPI (open pre-press interface) operations include high resolution image swapping. The programs and machines used for OPI include applications, such as, Xinet Full Press, Helios OPI, Color Central, IPT's Can OPI, and other applications. OPI, or image swapping, can be utilized in two areas during operation of system **100**. Specifically, there is OPI of images and OPI of complete pages. As an alternative to page-based OPI, PDF and Extreme applications can be used. As an alternative to image-based OPI, high data compression capabilities allow high resolution image files to be compressed and used as lower resolution image files. Decompression of the image files happens dynamically at the RIP stage.

OPI operations provide for the use of a lower resolution file to be used as a proxy to the higher resolution file. Lower resolution files can be maintained with smaller storage capacity devices, such as, system components at user facility **300**. Further, lower resolution files can be transferred via a network much faster.

Content management includes the capture, organization, archival, retrieval, and reuse of digital assets or electronic files, such as text, graphics, photos, artwork, full pages, audio, video, and completed projects. Content management facilitates the internal and external sharing of assets; organizes and catalogs the content; simplifies the creation of packages, advertising, and collateral materials; and allows users to browse, search and retrieve their files and data. Functional components used in content management can include a computer server, a relational database, at least one graphic engine, and a web-compliant Java interface. Content management operations are performed primarily utilizing DCM system **130** (FIG. **1**).

An exemplary process of content management is described as follows and shown in FIG. **16**. First, assets or files to be databased are identified (block **1602**). The assets or files are cataloged or imported into the digital content management (DCM) database (block **1604**). The necessary

metadata or attributes of information that will be tracked for each asset are established (block **1606**). The metadata is either entered manually or integrated with existing business databases (block **1608**). The users who will have access to the database are established, including permission and privileges (block **1610**). The necessary systems and procedures to secure, backup, and archive the database are established (block **1612**). The necessary systems and procedures to distribute assets to users are established (block **1614**).

The DCM system provides a database or other record of all the files that a user wants to keep track of and a variety of different ways to access that database and those files. Advantageously, any authorized user, anywhere in the world, can access content managed by the DCM system over any available LAN, WAN or Internet connections. DCM system functionality and operations are discussed further in more detail with reference to FIG. **11** et seq.

FIGS. **6** through **8** illustrate exemplary process flows of different embodiments of printing and publishing system **100**. In particular, FIG. **6** is a flow chart illustrating operations performed utilizing printing and publishing system **100**, where prepress operations are performed at end user facility **300**.

At step **610**, a client, such as, end user facility **300**, provides digital files or transparencies for scanning to central service facility **105**. At step **615**, central service facility **105** stores high resolution image files (e.g., graphics files)on server **110** and generates low resolution image files. At step **620**, central service facility **105** logs files into DCM system **130**. The client builds page layout using, for example, desktop computer **320** at step **625**.

At step **630**, the client communicates with DCM system **130** to search its database and drag/drop elements into layout from the electronic files in low resolution format stored at central service facility **105**. Once the client completes the design of the layout, the client prints a Postscript file to a spooler on server **110** at step **635**. Server **110** swaps out low resolution files for high resolution files and generates a PDF file at step **640**. The PDF file is forwarded to a remote proofing device, such as, digital color proofer **330** or laser printer **340** via a communication link at step **645**. At step **650**, the PDF file is imaged to the remote proofing device at end user facility **300**.

At step **655**, finished plate-ready files are sent to printing company facility **400** via a communication link, such as, private network **160** or public network **190**. Printing company facility **400** images approved page layouts to a print at step **660** and prints the pages.

FIGS. **7**A and **7**B are a flow chart illustrating operations utilizing printing and publishing system **100** where prepress operations are performed by printing company facility **400**. In particular, the exemplary operations illustrated in FIGS. **7**A and **7**B provide for the situation where the page layout designer is not a subscriber to printing and publishing system **100**.

At a step **710**, printing company facility **400** scans page layout transparencies or receives digital RGB images and/or printing company facility **400** receives digital files from its client. At step **715**, printing company facility **400** sends files to central service facility **105** via communication link and network, such as, private network **160** or public network **190**. At step **720**, printing company facility **400** writes the files to HSM system **120** at central service facility **105** where a corresponding low resolution image is created.

Printing company facility **400** updates links to low resolution images provided in page layout at step **725**. At step **730**, printing company facility **400** prints a Postscript file to a spooler on server **110** at central service facility **105**. Central service facility **105** swaps out low resolution images for high resolution images and generates a PDF file at step **735**. At step **740**, the PDF file is written to server **110** at central service facility **105**.

At step **745**, the PDF file is imaged to a proofing device at printing company facility **400**. The proof is then sent via a pack and ship courier to the printing company client. At step **750**, the client approves the proofs or makes necessary corrections. The client ships the markup proof back to printing company facility **400** for any revisions at step **755**. At decision **760**, if any revisions are necessary, step **727** is performed in which printing company facility **400** makes corrections based on the proof returned from its client. After step **727** steps **725**, **730**, **735**, **740**, **745**, **750**, and **755** are performed.

If no additional revisions are necessary, step **765** is performed in which the finished plate-ready files are generated at printing company facility **400**. At step **770**, printing company facility **400** enters plate-ready files into DCM database **132**. At step **775**, PDF files are digitally imposed at printing company facility **400** and are processed into virtual proofing software (VPS) preview files. VPS preview files provide a digital soft proof which provides for review of content of the PDF file. VPS preview files are approximately **300** dpi (dots per inch). At step **780**, printing company facility **400** images imposed preview files to ink jet proof and plates final pages when approved.

FIGS. **8**A and **8**B are a flow chart illustrating operations utilizing printing and publishing system **100** where prepress operations are performed by central service facility **105**. In particular, the exemplary operations illustrated in FIGS. **8**A and **8**B provide for the situation where the page layout designer is a subscriber to printing and publishing system **100**, such as, end user facility **300**.

At a step **810**, central service facility **105** scans page layout transparencies or receives digital RGB images and/or central service facility **105** receives digital files from end user facility **300** via a communication link. At step **815**, central service facility **105** writes the files to HSM system **120** where a corresponding low resolution image is created.

Central service facility **105** updates links to low resolution images provided in page layout at step **820**. At step **825**, central service facility **105** prints a Postscript file to a spooler on server **110**. At step **830**, central service facility **105** swaps out low resolution images for higher resolution images and generates a PDF file. At step **835**, the PDF file is written to server **110**.

After step **835**, either step **840** or **845** is performed. Step **840** includes the imaging of the Postscript file to a proofing device at end user facility **300**. Step **845** includes imaging the Postscript file to a proofing device at printing company facility **400**. If step **845** is performed, step **850** is performed where end user facility **300** receives proofs from printing company facility **400** via pack and ship courier. After step **850** is performed, if at all, a step **855** is performed in which end user facility **300** approves proofs or makes necessary corrections to the page layout file.

At step **860**, end user facility send a marked-up digital proof back to printing company facility **400** for revision cycle. At decision block **865**, if there are any revisions, a step **827** is performed in which central service facility **105** makes corrections based on the marked-up proof. After step **827**, steps **820** through **860** are performed.

If no additional revisions are necessary, step **870** is performed in which finished plate-ready files are made

available to printing customer facility **400** via communication link. At step **875**, printing company facility **400** enters plate-ready file into DCM database **130**. At step **880**, plate-ready files pages are digitally imposed and imaged to proofing device at printing company facility **400**. At step **885**, printing company facility **400** images the proof pages to plate and prints the job.

FIG. **9** illustrates a exemplary production workflow of printing and publishing system **100**. In particular, FIG. **9** illustrates the format changes undergone throughout the workflow of printing and publishing system **100**. At step **910**, using a page layout application, such as, QuarkXpress, end user facility **300** performs page design. At step **920**, page layout application establish links to other art and imaging files on central service facility **105**. At step **930**, once the page is built, content is reviewed using a black and white laser printer.

At step **940**, end user facility **300** prints the page to a "thin" Postscript file at central service facility **105** with OPI comments imbedded. The Postscript file is called "thin" because it contains low resolution images. At step **950**, the thin Postscript file is dropped into a "hot" folder on server **110**, which parses the thin Postscript file, pulls out the OPI data, and replaces it with high resolution data. Once the page includes high resolution data, it is considered to be in "fat" Postscript format.

At step **960**, the fat Postscript file is distilled to a PDF and written to the customer storage volume and to the remote proofing device. PDF files are used to generate digital proofs remotely because PDF incorporates a low level compression algorithm that allows for more efficient transmission over telecommunication lines.

Once the page has been approved for imaging to plate, at step **970**, the PDF files are converted to a Postscript format for purposes of plate output. PDF is considered a Postscript 3 format. Conventional hardware and software infrastructure is unavailable to accept PDF, but rather accepts Postscript level 2. Thus, PDF must be converted from Postscript 3 to Postscript level 2.

FIG. **10** illustrates the HSM system **120** in more detail. HSM system **120** includes HSM server **122** which is coupled to and communicates with server **110**. Server **110**, in turn, is coupled to and communicates with local network **150**. In this manner, HSM system **120** is coupled to and communicates with local network **150**. HSM server **122**, in turn, is coupled to and communicates with RAID **1000**, magneto-optical jukebox **1002**, and DLT jukebox **1004**. Of these three storage devices, RAID **1000** has the fastest access time and is the first tier of storage. Magneto-optical jukebox **1002** has a slower access time and is a second tier of storage. DLT **1004** has the slowest access time and is the third tier of storage.

HSM server **122** serves three primary functions: first, it receives requests for customer files, typically from DCM system **130**, and retrieves those files from the three storage devices **1000**, **1002** and **1004**. Second, it stores files to the storage device **1002**, **1004**, **1006**. Third, it manages the allocation of space on each of the storage devices and periodically moves files from one tier of storage to another tier based on a set of internal rules. These internal rules are stored in a rule base **1006** in HSM server **122**. These internal rules include both global rules **1008** and customer rules **1010**. The rule base **1006** is accessed by CPU **1012** to determine whether the current tier of storage is appropriate for a particular file. For example, global rules **1008** may include rules that determine storage based on file size, last access time, or file type (for example, if the file is a page layout application program document, a high resolution graphic document, a low resolution graphic document, or a thumbnail).

The customer rule base is actually a collection of rule bases one provided for each of the customers that use the system. The customers when used in this sense, include the end users and the printing company in charge of the printing company facility. Customer rules determine storage similarly on file type, file size, and last access date. In addition, customers may have particular concerns for the access time of their files, and thus may have additional rules specific to their operations. For example, in a preferred embodiment, it is desirable to have high resolution graphic files used for the creation of printing plates to be stored in the second or third tier of storage, the M/O jukebox and the DLT jukebox since these items are not accessed often, and may have rules that keep thumbnails and low resolution versions of the high resolution image files in tier one and tier two storage, the RAID **1000** and the M/O jukebox **1002**. In this manner, the high resolution graphic files that are accessed by the plate production process, described elsewhere herein, can be stored in a device having a greater access time. Further, the low resolution graphic file equivalence of those high resolution graphic files can be stored in a faster access time medium. As such, the end users personnel that create the QuarkXpress documents can access the low resolution image for creating Quark documents from a low access time storage media while permitting the not-so-time-critical platemaking process (described elsewhere herein) to access the high resolution equivalence of those low resolution graphic files from a high access time storage device.

HSM server **122** also includes a hierarchical file database **1014** that is provided to locate and identify all the customers' files. The hierarchical file database **1014** is accessed by CPU **1012** when a file retrieve or a file store request is made of hierarchical HSM system **120**. The hierarchical file database (HFD) **1014** includes a plurality of tables that correlate each file's name, path, location on a particular storage device **1000**, **1002**, **1004** for each file stored in HSM system **120**. In this manner, when the HSM system **120** receives a request for a file, it refers to HFD **1014** to locate the particular storage device on which that file is stored, and can then access that file and provide it to the requestor. Similarly, when the HSM system **120** receives a file storage command, CPU **1012** will access HFD **1014**, create a new entry for a new file, refer to the global and customer rules on storage in rule base **1006** to determine where to store that file, and then store that file on the appropriate storage device **1000**, **1002**, and **1004**.

FIG. **11** illustrates a detailed view of the digital content management or "DCM" system **130**. DCM system **130** includes two major sub-systems, database **132** and DCM server **131**. DCM system **130** performs several important functions for the central service facility. First, it controls access to customer's files. Second, it sends file access, file modification and file deletion requests to HSM system **120**. When a customer of central service facility **105**, whether at end user facility **300** or printer customer facility **400**, or whether over public network **190**, or private network **160**, access central service facility **105**, the access request is sent to DCM server **131**. The customer will preferably use a webbrowser, such as Internet Explorer or Netscape Navigator or similar products to make the initial connection to central service facility **105**. This request will be sent to DCM server **131**. The customer will provide DCM server **131** with access control information, for example a user name,

password, machine identifier. This information may be entered by the customer at a workstation keyboard in the end user facility **300** or printer customer facility **400**, or may be stored as a "cookie" at that workstation to permit automatic connection to the central service facility without entry of access control information from the keyboard.

Upon receiving this information, DCM server **131** will determine if the customer is permitted to access central service facility **105**. If so, DCM server **131** will permit access but only to the extent provided by that customer's profile. DCM server **131** permits a wide variety of accounts to be created. A small client, for example, may have a multiple account for everyone at that customer's end user facility **300** or printer customer facility **400**. Larger customers may have multiple accounts (and hence a single account username and password) for each department. Even larger customers may have an account per each individual employed by the customer. The arrangement chosen by the customer will depend on their particular needs and level of security concerns.

Each different user account has an associated profile. These profiles determine such things as the type of files that may be access at central service facility **105**, the time files may be accessed at central service facility **105**, and the access each account has to particular programs at central service facility **105**. For example, a field representative of the customer who is responsible for selling customer's products, may merely be able to browse the files to see what kind of products are available. Others may have the ability to browse, download, and/or retrieve files. Some accounts may have associated within the ability to not only retrieve but to make edits to files and record those changed files back into DCM database **132**.

DCM server **131** maintains the profiles in the DCM database **132** which includes asset tables **1102** and user profile tables **1104**. User profile table **1104** includes a plurality of user profiles, at least one for each customer of central service facility **105**. Each customer profile, in turn, can be broken down into group profiles, for example, departmental profiles for marketing, manufacturing, sales staff, and outside customers, or clients; and individual profiles, for example, individuals who prepare printed documents, individuals who must review prices, and individuals who must approve catalog or advertising copy. Thus, each customer may have a plurality of group profiles, and each of those group profiles may have a plurality of individual profiles. Each nested category of profiles is inherited. For example, an individual profile inherits the profile of the group to which he is assigned and the group inherits the profile of the customer to which he is assigned. These profiles can be remotely edited by a customer administrator, for example, at end user facility **300** or printing company facility **400**.

The user profiles, both at the customer, group and individual levels, include rules that permit access to files to be controlled. For example, these rules can permit files to be retrieved, saved or edited. File access permissions can be granted on the basis of file size, file date, file type and location of the file in the customer's hierarchical file data space established by hierarchical file database **1014** of HSM system **120**. In addition, and of particular benefit to a central service facility for publishing and printing services, the rules may control access based upon file content, for example, whether the file contains graphical information, textual information or whether the file is a page layout application program template document, such as a PageMaker, or QuarkXpress document.

User profiles also include presentation rules that govern the manner in which the data managed by DCM system **130** is presented to the customer. For example, rules are provided that indicate the type of file access tool used by the customer or the quality or speed of the data connection. For example, certain customers, groups or individuals may communicate over a slow communications link and hence would not have access to large high resolution images which bog down the communications link. As another example, these profiles may indicate the type of browser or access tool employed by the customer and limit the information to the customer to files that can be properly displayed by the software at the customer's facility.

Finally, the profiles may establish access based upon permitted or non-permitted attributes of the files that are maintained in the asset tables. For example, a group profile is created for outside vendors that includes rules limiting their access to tables indicating the price of products but permitting them to see attributes in the asset tables regarding the availability of certain products. In another example, a marketing management group could be created with profiles that permit access to view catalogs (typically stored as page layout files with links to graphics and textual information represented in the page layout file) but not permit members of the market manager group to edit the catalog itself, that privilege being limited to the customer's personnel who are responsible for creating the catalog.

Regarding asset tables **1102** in DCM database **132**, data is stored in these tables as metadata. Metadata includes file properties, data attributes and history information regarding the files themselves. File properties are maintained and updated automatically by DCM system **130**, whenever a file is saved, retrieved, created or otherwise accessed. File properties include such data items as file size, file type, resolution and physical size (for graphic files representative of drawings and photographs). The second class of metadata stored in the asset tables include file attributes, such as cost, SKU, product name, model number, part number, vendor, volume discounts, product availability, product manufacturer and price, of the product shown (if the file is a graphics file) or described (if the file is a textual file) for each such graphic or text file maintained in the DCM database **132**. This information is of particular value in creating advertising literature or catalogs. With these links established in DCM system **130**, the system can automatically insert a price, product name, model number or other data into the catalog associated with a particular picture of that product when advertising literature, catalogs or brochures are created.

Another type of attributes maintained in DCM system **130** relates to the use of a file. For example, graphical files (e.g., pictures and drawings) and text files (e.g., advertising copy, product descriptions, product names or the like) are associated with data indicative of a particular printed document in which they have been inserted. This data may reflect the publication date, the publication location, the printer that printed the data or the date or series of documents in which they were printed. For example, if a photograph was previously used in a "Spring 1995 Sales Catalog" distributed in the winter of the preceding year, this catalog identifier (Spring 1998 Sales Catalog or similar information) would be associated with that file. In this manner, a person assembling a catalog or advertising material can readily identify the files (either graphical or textual) that were used previously, and how they were used.

The attributes associated with a file recorded in DCM database **132** will also include data indicative of the creative

source and legal status of the file. This data will include such attributes as (in the case of graphical files) the artist who made the drawing, the photographer who photographed the drawing or otherwise converted it into digital form, data indicative of the ownership of the copyright, both of the original graphic and the person who converted it into digital form, data indicative of the legal rights, the customer has to copy, distribute or otherwise use the file. This data includes such information as the copyright holder, data indicative of the license or assignment that permits the customer to use the file, and data indicative of any significant contractual obligations regarding those rights, such as the number of times the file has been published, reproduced or otherwise used, as well as the number of times the file can be used again under the associated contract, license or assignment identified by the data indicative of legal rights.

Tables in DCM database **132** also include attributes that relate the particular file to other, associated files. These associated files would include (in the case of graphical files) an attribute indicative of a text file that describes the item or items illustrated in that graphical file. This association capability is of particular importance in laying out brochures, catalogs or other advertising materials, in which both images and associated text are disposed on a page or pages of these advertising materials in an associated arrangement. For example, in catalogs it is routine to provide a photograph of a product in association with a textual description of that product. In this manner, by associating a graphic file with a textual file, an individual laying out the catalog or other advertising materials can select both an image of a product and one or more textual descriptions of that product for insertion in proximity to each other without having to do a full text search of many text files for a SKU number or product number. Similarly, a plurality of graphics files, all illustrating the same product or item can be linked in this manner or a plurality of text files, each describing the same item or product can be similarly linked. In this manner, a graphic artist laying out the catalog, brochure or other advertising material can easily search for and retrieve a list of graphics or textual files describing a single product to permit easy examination of and selection between for insertion into catalogs, brochures or other advertising material. The method of searching is described below.

Finally, the metadata stored in the asset tables include fields indicative of file historical information for each of the files stores in DCM system **130**. This data includes such information as dates and times of access for each file, types of access (read, write, revise or create), and the person (e.g., the account number, individual, group or customer number identifier) who performed these file accesses.

The end user accesses central service facility **105** by connecting over private network **160** preferably using an ATM transport protocol or public network **190**, such as the Internet. When private network **160** is used, the end user's workstation is preferably configured to show the customer's files on a central service facility's HSM system **120** as a drive icon appearing on the screen of the workstation. Since the network is private, log-on procedures may or may not be required and the user may treat HSM system **120** as another drive for the storage and retrieval of files. DCM system **130** does not mediate these communications.

Alternatively, central service facility **105** can be coupled to an end user over public network **190**, such as the Internet. In this second access mode, as shown in FIG. **17**, block **1702**, the end user makes the initial contact with central service facility **105** using an Internet browser, such as Internet Explorer or Netscape Navigator and entering the Uniform Resource Locator (URL) of central service facility **105** in the browser's address location box. This URL or domain address name connects the end user to DCM system **130**. DCM system **130**, in turn, transmits a hyper-text document to the end user over the Internet. This hyper-text document is preferably a form, and includes blanks for user name and password. Once the end user enters this information and transmits it back to the central service facility, the central service facility, and DCM server **131**, in particular, verifies the user name and password with account information stored in the user profile. If there is no correspondence between the user name and password provided by the end user the central service facility, and the DCM server **131**, in particular, will not verify the end user access to the central service facility. If there is correspondence between the user name and password provided by the end user and corresponding account established in the user profile, the DCM server **131** will grant file access permission to the end user in accordance with the corresponding user profile.

In block **1704**, and once the communications channel is established between central service facility **105** and the end user, DCM server **130** transmits several Java applets that configure the end user's browser in accordance with data indicative of the end user browser type stored in that end user's profile. These applets are programs that control the workstation's display and communications with DCM system **130**. The applets are received and integrated into the operations of the end user's browser and the browser presents the end user with several selectable icons on the screen. These icons represent functions provided by the Java applets that were previously sent from central service facility **105** to the end user's browser. The icons are representative of functions such as browsing, searching, uploading, downloading, deleting, viewing, and editing files stored in HSM system **120** and identified in DCM system **130**. By distributing these applications in the form of Java applets, the end user can, at any location, access customer data stored at the central service facility.

In block **1706**, to locate a file, the user will select the search icon which executes the Java search sub-routine. When the search routine is executed, the Java applet communicates with central service facility **105** to identify the mode of operation of the browser. In response to the request for a search, DCM server **132** queries the user profile, and determines which tables and which attributes of those tables, that the end user is permitted to see and/or search on. In block **1708**, the names of these attributes are transmitted to the end user's browser and are displayed on the screen of the end user's workstation in the form of a user selectable list box. In block **1710**, the user selects one or more attributes on which he would like to search, as shown in FIG. **12**, and selects an on-screen icon to perform the search. For example, in FIG. **12**, the user has selected the attribute **1202** named "File Name" on which the search had indicated by the check mark next to the attribute name in the pull-down list box **1204**. In an adjacent list box **1206**, the Java search applet displays a plurality of search relationships, relating the attribute in DCM database **132** to be searched with a particular variable. In this case, the search relationship is "contains". Other relationships include but are not limited to "greater than" or "less than" which are typically used with metadata having numeric attributes, and "before" and "after" which are commonly used with metadata attributes containing time or date values, as well as "starts with", and "ends with" which indicate a particular location in an attribute value.

A third textbox blank **1206** is provided in which the end user can type the particular string or number to be searched

for. In this case, the end user has selected the string "12345". Once the end user has finished creating a query on screen, the end user executes the search query by clicking an on-screen icon indicative of his desire to execute the search **1208**. In this case the "search" icon blank is selected.

Once the query has been assembled in the foregoing manner and executed, the Java applet, in response to the selection of the "search" icon, sends the search to DCM server **131** which converts the on-screen search into a standard query language form, such as SQL. As a part of that processing, DCM server **131** queries the user profile to determine whether the end user is permitted to search on these attributes, and which if any, database records or assets in DCM database **132** match this query that the end user is permitted to see.

In block **1712**, assuming the end user is permitted to view the results of the search, DCM server **131** then prepares the search results and returns them to the end user in several different forms. For example, as shown in FIG. **14**, if the user has selected a "tile view" **1400** DCM server **131** returns a thumbnail representation **1402** of the graphics file identified by the search together with a file name. These thumbnail graphics are a very low resolution version of the graphic file stored on DCM server **131** and, thus, are particularly well suited to be transmitted over a slow communications network with minimal use of bandwidth. Alternatively, if the user has selected that the "single column view", DCM server **131** returns a thumbnail representation of the graphic file located by the search together with a plurality of attributes associated with that graphic file. The attributes are identified by attribute name and the metadata associated with those attributes. For example, in FIG. **15**, DCM server **131** returns the attributes of file name **1502**, SKU **1504**, related SKU **1506**, images to web **1508**, user notes **1510**, product category **1512**, product description **1514**, alias item code **1516**, long name **1518**, file size **1520**, creation date **1522**, colors **1524** (of the product shown in the graphic) and sizes **1526** (of the product shown in the graphic file). This form is particularly beneficial to graphic artists who are creating a catalog. The particular attributes (but not their values) shown together with the very low resolution thumbnail graphics file **1528** are stored in the user profile for the end user accessing the DCM server **132**.

The user may edit these to add or remove particular attributes to be displayed in any of the aforementioned views. In addition, the user profile may include rules restricting the end user from viewing certain attributes, for example, cost and volume discounts for particular products shown in the thumbnail graphic.

In FIG. **13**, a text view of the search results is shown, in which no associated thumbnail graphic is provided. The attributes shown here are file name **1302**, SKU **1304**, related SKU **1306**, product description **1308** and images to web **1310**. This is particularly useful in very low bandwidth situations in which the communications link between the end user's workstation and DCM server **131** is quite slow. Again, as in the preceding example, the user can select the particular attributes that are to be displayed.

Once the Java applet presents the search results to the end user in the designated form on the screen of the end user's workstation, the end user can scroll through the search results and select particular listed files for insertion into a page layout application program document. In the preferred mode of operation, the page layout application program will run simultaneously with the browser program that executes the Java applets. The page layout application program more preferably will be minimized or function in a background mode when the end user interacts with the browser. The end user will select the desired graphic file from the list of search results in the browser window, and will transfer the graphic file to the page layout application program document. Typically, this transfer occurs by the end user copying the desired graphics file to the workstation's operating system's clipboard, or by dragging the graphics file from the browser window and dropping it in the window of the page layout application program. Once in the page layout application program document, the user can manipulate the image to place it in the desired location.

While the searching and placing process described above has been described in conjunction with a graphic file stored in DCM database **132**, it is not limited to graphics files. The end user may search for and place other file types as well in the same manner. These file types preferably include font files, logo files, text files, and page layout files. Although a page layout application program is mentioned in the above searching and placing process, it is equally applicable to desktop publishing programs as well.

When the page layout application program document has been assembled, typically of elements such as graphic files, text files and logos, the end user will then save the assembled document back to the central service facility's DCM system **130** and HSM system **120** in the following manner.

The end user first transfers the document from the page layout program to the browser. This is preferably done using the end user workstation operating system's drag and drop capability or by transferring the document to the operating system's clipboard and pasting it in the browser. Once in the browser, the user selects the "upload" icon which indicative of Java applets document uploading sub-routine. When this sub-routine is selected, the Java applet communicates data indicative of the end user, the file(s) being uploaded, and the save request to DCM server **131**. When DCM server **131** receives this information, it queries the user profile to determine whether the end user has the appropriate access rights to upload the document.

If the document is a new document, DCM server **131** will query the user profile to see if the end user has access rights to upload a new document, and hence create a new record entry in DCM database **132**.

If the end user is merely saving an edited version of a page layout application program document that the end user previously copied from the DCM database **132**, DCM server **131** will query the user profile to determine if the end user's access rights include the right to save a revised document over an existing document, thus erasing the previous document and replacing it with the end user's newly edited document.

If the document is to be saved as a new document file, and the end user has rights to save a new document and therefore create a new file entry in DCM database **132**, DCM server **131** will transmit a request for attribute information to the browser. When the browser receives this request, it will query the end user for predetermined attributes, such as the file name. This query will preferably be displayed as a prompt on the end user's workstation screen. The end user then enters the predetermined required attribute information and transmits this information to DCM server **131**. The browser then transmits the document file to DCM server **131**, and DCM server **131** creates a new database entry for the document file in DCM database **132**. The document file is then transmitted to HSM server **122** to be stored in one or more storage devices: **1002**, **1004**, **1006**.

Advantageously, when creating the new DCM database **132** entry for the document, DCM server **131** examines the contents of the document file, determines the file type based upon the contents, and creates an appropriate entry in the DCM database **132**. This includes the steps of identifying the attributes predefined for that file type in DCM database **132** and creating new entries in the asset tables for those attributes and associating them with the document file.

While the embodiments illustrated in the FIGURES and described above are presently preferred, this should be understood that the embodiments are offered by way of example only. Other embodiments may include any variation of configurations, file attributes or any type of communication network. The invention is not limited to a particular embodiment, but extends to various modifications, combinations, and permutations that nevertheless fall within the scope and spirit of the appended claims.

What is claimed is:

1. A printing and publishing system which generates a printing plate-ready file from data provided remotely in real time using a communication network, the printing and publishing system comprising:

an end user facility coupled to a communication network, the end user facility providing page building operations, the page building operations including the design and construction of pages from images, text, and data available via said communication network;

a central service facility coupled to said communication network, the central service facility providing storage, file processing, remote access, and content management operations; the file processing operations including generating a plate-ready file from pages designed at said end user facility, said plate-ready file having a file format capable of high resolution and ready for creation of a printing plate;

a printing company facility coupled to said communication network, the printing company facility providing printing operations, the printing operations including producing a printing plate from said plate-ready file; and

wherein the end user facility further comprises a communication routing device coupling the end user facility to the communication network, a computer which performs page building operations, and a proofer which provides printed samples of pages.

2. A printing and publishing system which generates a printing plate-ready file from data provided remotely in real time using a communication network, the printing and publishing system comprising:

an end user facility coupled to a communication network, the end user facility providing page building operations, the page building operations including the design and construction of pages from images, text, and data available via said communication network;

a central service facility coupled to said communication network, the central service facility providing storage, file processing, remote access, and content management operations; the file processing operations including generating a plate-ready file from pages designed at said end user facility, said plate-ready file having a file format capable of high resolution and ready for creation of a printing plate;

a printing company facility coupled to said communication network, the printing company facility providing printing operations, the printing operations including producing a printing plate from said plate-ready file; and

wherein said file processing further comprises performing open prepress interface (OPI) operations.

3. A printing and publishing system which generates a printing plate-ready file from data provided remotely in real time using a communication network, the printing and publishing system comprising:

an end user facility coupled to a communication network, the end user facility providing page building operations, the page building operations including the design and construction of pages from images, text, and data available via said communication network;

a central service facility coupled to said communication network, the central service facility providing storage, file processing, remote access, and content management operations; the file processing operations including generating a plate-ready file from pages designed at said end user facility, said plate-ready file having a file format capable of high resolution and ready for creation of a printing plate;

a printing company facility coupled to said communication network, the printing company facility providing printing operations, the printing operations including producing a printing plate from said plate-ready file; and

wherein the printing customer facility further comprises a communication routing device coupling the printing company facility to the communication network, a computer which performs imposition operations, and a platesetter which exposes a printing plate.

4. A method of generating a plate-ready file configured for the creation of a printing plate, said plate-ready file being associated with page layouts and being provided in real time from a remote location using a communication network, the method comprising:

remotely providing access to imaging files for searching and retrieving images used in the design of a page layout by a remote user,

establishing links to said imaging files, thereby creating a thin Postscript file from the page layout designed by the remote user;

parsing said thin Postscript file to extract data associated with low resolution images and replace with high resolution data, thereby forming a fat Postscript file,

creating a portable document format (PDF) file from said fat Postscript file, and

converting said PDF file to a file in plate-ready format.

5. The method of claim **4**, further comprising communicating said PDF file to said remote user for proofing and revision of the page layout.

6. The method of claim **4**, further comprising converting said file in plate-ready format into a virtual proofing software proofing file.

7. The method of claim **4**, wherein the step of remotely providing access to imaging files for searching and retrieving images and used in the design of a page layout by a remote user comprises dragging and dropping elements selected from a database of said imaging files.

8. The method of claim **4**, wherein the step of remotely providing access to imaging files for searching and retrieving images used in the design of a page layout by a remote user comprises using a web browser configured for communications over the Internet.

9. The method of claim **4**, wherein the step of remotely providing access to imaging files for searching and retrieving images used in the design of a page layout by a remote

user comprises using a private network configured for dedicated communications.

10. A method of generating a plate-ready file configured for the creation of a printing plate, said plate-ready file being associated with page layouts and being provided in real time from a remote location using a communication network, the method comprising:

storing high resolution files on a computer server;

generating low resolution files corresponding to said high resolution files;

providing said low resolution files to a remote client for the designing of a page layout via a communication network;

generating a plate-ready file from the page layout designed by said remote client; and

providing said plate-ready file to a remote printer.

11. The method of claim **10**, wherein the low resolution files are stored in a storage device at a central service facility.

12. The method of claim **10**, wherein the step of generating a plate-ready file from the page layout designed by said remote client comprises receiving a Postscript file from said remote client via the communication network; and swapping low resolution files used in said page layout with high resolution files.

13. The method of claim **10**, wherein the step of generating a plate-ready file from the page layout designed by said remote client comprises converting the page layout from a Postscript file to a portable document format (PDF).

14. The method of claim **13**, wherein the step of generating a plate-ready file from a page layout further comprises converting said PDF file to said plate-ready file.

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